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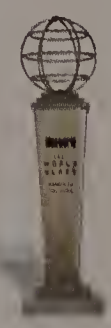

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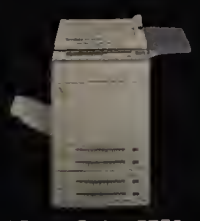
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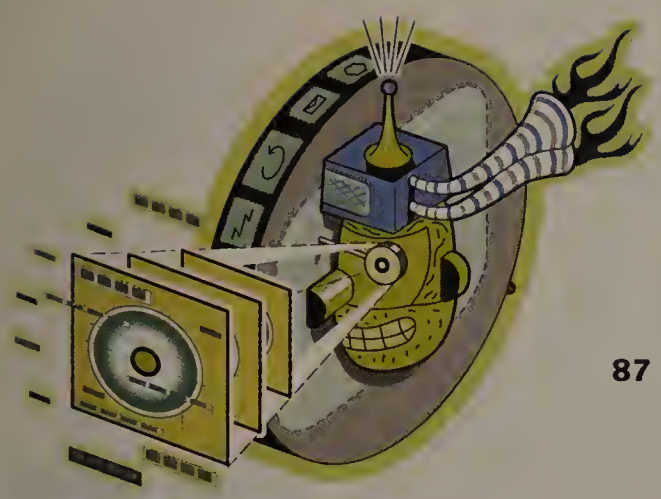

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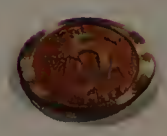

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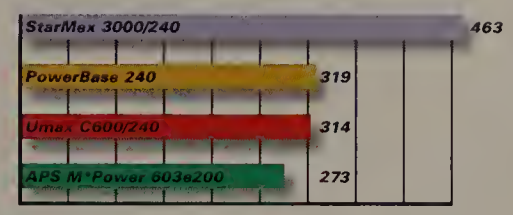

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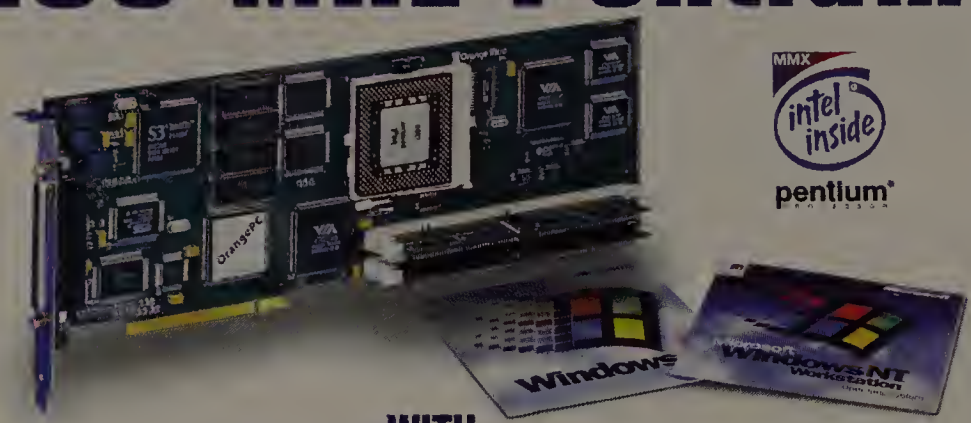

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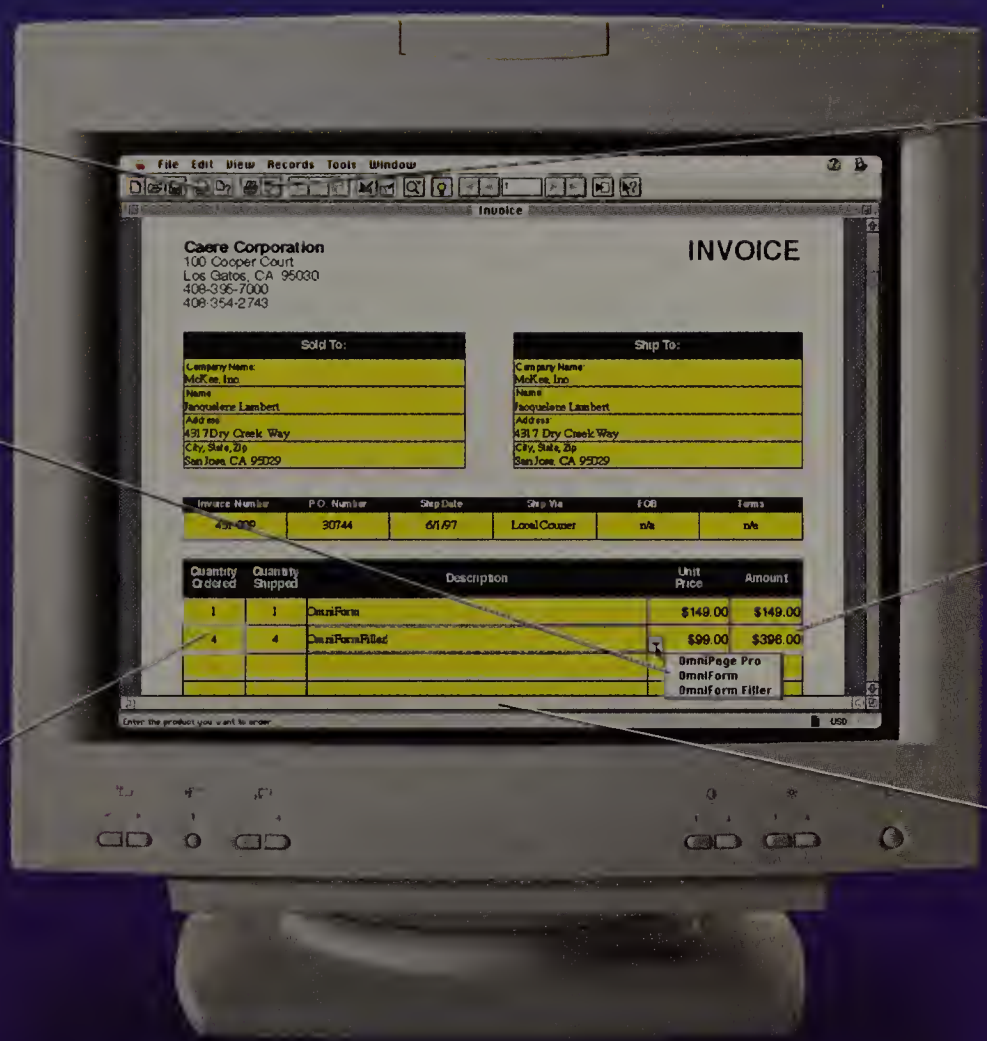

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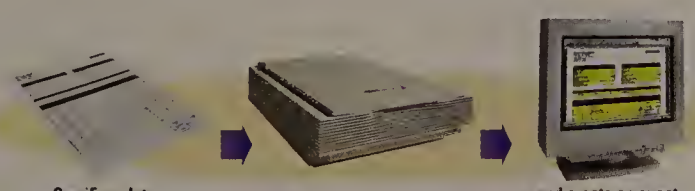

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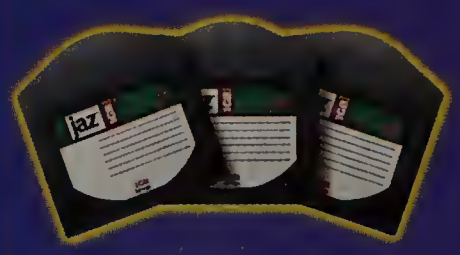

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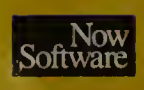

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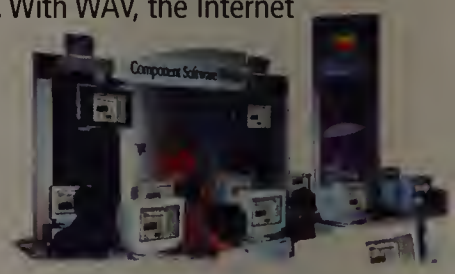

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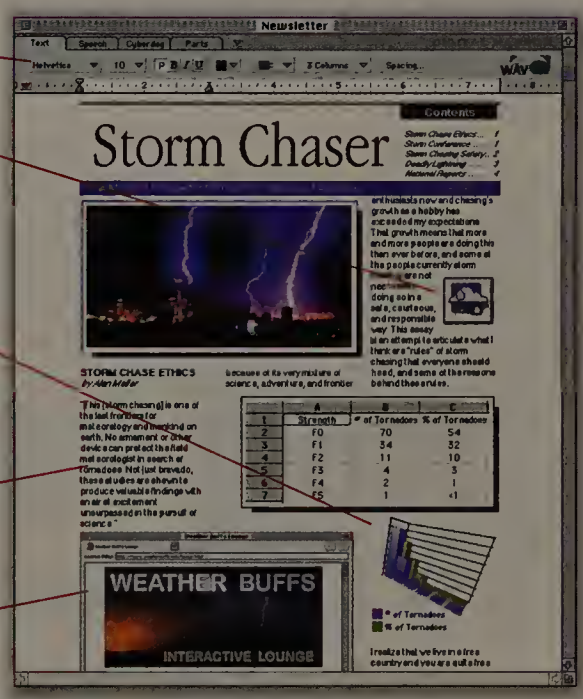

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Freakin' Awesome rating, Mac Addict Magazine, March '97

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MAY 1997

Letters

The Mac OS: Future . . .

I HAVE JUST READ YOUR INFORMATIVE pieces on the possibilities for a new Mac OS. I'm writing especially in response to Adrian Mello's column outlining a five-point plan for Apple (*State of the Mac*, February 1997). I think one point should be added: Make it fun!

While preemptive multitasking, protected memory, and multithreading may be important for performance, the great thing about the Mac has always been that it's fun. The new OS needs to be, above technical issues, imaginative. When I see mock-up screen shots of it in *Macworld*, I want to say, "Cool!" The Be OS screen on page 125 made me say, "Oh—Windows 95 on a Mac."

Now that Microsoft has assimilated the desktop analogy, I'd like Apple to leave Windows in the dust with something so innovative that it will take competitors another decade to copy it. My vote goes to a three-dimensional interface. The OS itself might open cubes instead of windows and let you monitor an open application's progress from the Finder or outside the cube, or dive into the cube to enter the application. Such a system would set the look and feel for the next decade, putting Apple in the forefront of operating systems.

And it would be very, very cool.

MAX HEIMAN
Austin, Texas

IT'S AMAZING TO ME JUST HOW MUCH yapping the Mac community can do about what ought to be considered good news: the acquisition of Next by Apple and the reemergence of Steve Jobs.

Surely the Next operating system, as mature as it is, will have more to offer the Mac platform than does Be ("Time for a

New OS?" February 1997). Yeah, Be is fast, but a lot of that is probably due to the fact that it doesn't really have to do much. Shift-start your Mac and tell me it doesn't run faster. Be can't even print!

As for Steve Jobs, a lot of people say he is stubborn and has a big ego, and that is why Apple got into trouble. But Jobs can't be blamed for these latest years of pigheaded decisions. They must be blamed on the succession of generic CEOs who had little idea what the industry is all about. During that period they were more concerned about how the product was perceived than how well it worked, as though the two weren't connected.

JOHN LASRUK
Toronto, Ontario, Canada

. . . Present . . .

STEVE JOBS, NEXT, AND APPLE COULD not have given a finer Christmas present to those who have stuck by Apple and its technologies for so many years (see "Apple Acquires Next," Macworld Online, *http://www.macworld.com/daily/daily.892.html*).

It will be good to have the best operating system back again.

TODD SANDERS
Pittsburg, Pennsylvania

MY BIGGEST FEAR OF ANY NEW OS from Apple is that, in its efforts to address all possible scenarios, Apple will come up with another Frankenstein's monster that is first at nothing and second-best at everything.

The Type *whatever* error has become a way of life, and much of this is a result of the patchwork quilt that the Mac OS has turned into.

The more reasonable approach is to develop OS 8 as a PowerPC-only operating system and to clean up and stabilize OS 7 as a 680X0-only operating system.

ERIC P. OTTO
Charlotte, North Carolina

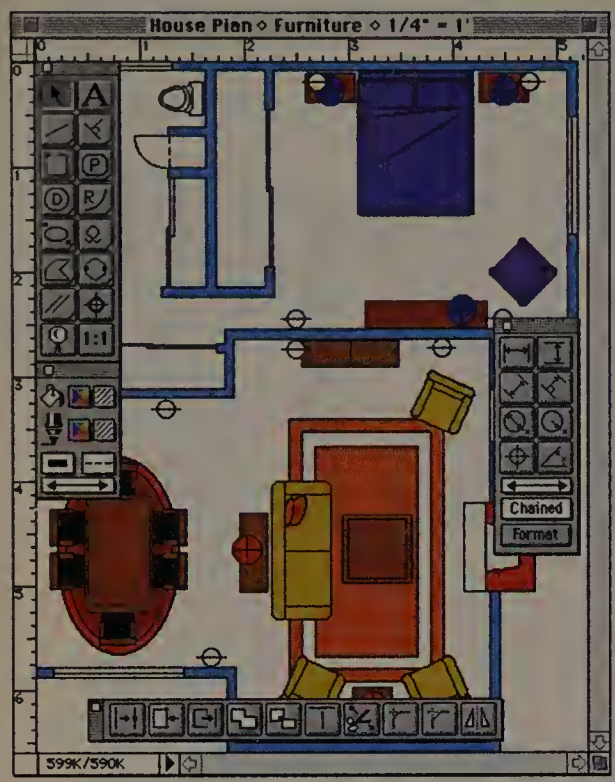
. . . and Past

AS A FORMER STAUNCH AMIGAN WHO has retired his worn and faithful Amiga 2000 to the flea market in exchange for the pride and contentment of owning a Performa 6320CD, I read your February article "Time for a New OS?" with great interest. I feel the Mac universe has grossly overlooked a vast resource and potential user base—the weary and disenchanted Amiga user.

There are some astonishing parallels between Apple and the Amiga in the areas of technical fumbles, managerial oversight, and gross public-relations neglect. They say that he who does not

continues

JEFF NEUMANN



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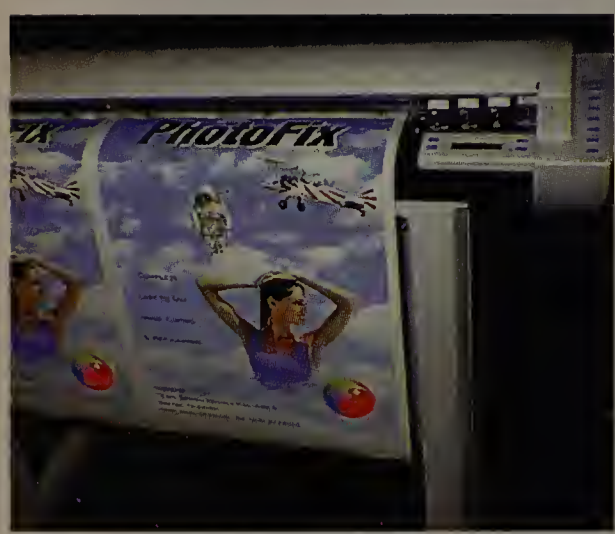

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Circle 20 on reader service card

CORRECTIONS

- *Apple printers do ship with the necessary cables ("Color Ink-Jet Jewels," February, 1997).*

study history is condemned to repeat it.

I only hope that as savvy and charismatic Steve Jobs settles down at Apple, he remembers that he once long ago envied the Amiga and, more important, can help draw the legions of disenchanted Amigans out there into the Mac fold by honor of implementing the Amiga's talents into the Mac's new OS.

JAMES W. GREENIDGE
via Macworld Online

In Defense of StarMax

ARE THE STARMAX 3000'S MINOR expandability limitations really enough to discount its obviously solid quality and performance (*Reviews*, February 1997)? When I studied your test results before purchasing a StarMax computer myself last November, I noticed that the 3000's 200MHz 603e processor scored better than a Power Computing PowerBase 240 in all categories except FPU-Intensive ("Motorola's Hot New Macs," November 1996). I disagree that a RAM limit of 160MB, the lack of an internal SCSI connector, and a non-upgradable CPU are reasons enough for a home user on a strict budget to ignore the savings that Motorola offers. I made up for the StarMax's relative deficiency in VRAM by substituting 2MB for Motorola's standard 1MB, and still came out with the most affordable home system I could find at this performance level.

CARL WITTENBERG
Water Mill, New York

The initial test results you saw in the November 1996 issue were for prototype systems, as indicated in that story. When we tested the final versions of the StarMax systems, the StarMax had no speed advantage, as reflected in the review in the February 1997 issue.

Don't worry, though—you got a good system. A three-star rating in Macworld *is considered good, while four- and five-star ratings are considered very good and outstanding.*

According to our information, the PowerBase and StarMax 3000 systems are similarly priced. Check out "Super Mac Values" in this issue for more about getting the most Macintosh for your dollar.—Ed.

Photoshop 4.0 Quirks

DEKE MCCLELLAND'S ARTICLE ON Adobe Photoshop 4.0 was right on the money ("Photoshop's New Look," February 1997). As one who is in and out of Photoshop on a constant basis, I have found the changes in the new version initially frustrating (I can't remember how many times I moved a selection instead of the contents of the selection) but eventually liberating as you incorporate the improved key commands into your subconscious. The one point Deke missed, however, is that it is possible to limit the effect of a correction layer to just one layer by selecting the Group With Previous Layers option on the adjustment layer's setup box. Just one more way that Photoshop 4.0 is making imaging work more productive.

TOM LANDECKER
San Francisco, California

I HAVE THE PLEASURE OF RUNNING ONE of the most exciting computer coloring studios in the United States, and we use Photoshop nearly exclusively for the production of color for comic-book publication. I recently opened up and installed my Photoshop 4.0 upgrade with barely concealed glee. Ah, now our production would double, triple, quadruple —all those strange little quirks . . . gone!

Then I discovered the truth: the only thing good about 4.0 is that it didn't write over 3.0.

DENNIS CALERO
New York, New York

Network Hell

I'VE JUST READ WITH GREAT INTEREST "Color Ink-Jet Jewels" (February 1997), and I noticed the article does not say anything about network capabilities.

I purchased the Hewlett-Packard DeskWriter 680c, described as having the fewest problems in printing. It did not work well at all. I have talked with several people who have the 680c, and it seems the 680c does not like to be networked.

I'm not sure about the Canon BJC-4550, but I know the Epson Stylus Color

continues

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500 is not networkable. I assumed the 680c was networkable since nothing in the documentation said otherwise.

DALE HALIFAX
Minden City, Michigan

*Most of these printers, including the HP 680c, connect to a Mac's serial port. (The Alps MD-2010 uses SCSI, and the HP DeskJet 1600CM comes with Ethernet.) Be sure to turn the printer on before you turn on your Mac, and use a cable from the printer manufacturer or Apple. If problems persist, HP recommends starting up with System 7.5 extensions only, less Desktop Printing and PowerTalk. Remove fax modem extensions if problems continue. Lastly, check Hewlett-Packard's Web site (*http://www.hp.com*) for the latest drivers.—Ed.*

Wish List

I WAS WONDERING IF THERE IS ANY way to display the processor speed in the way the About This Macintosh box displays the amount of RAM and OS version. I realize that this number is generally displayed on newer Power Macs as part of the model number, but it is not on older ones. I know there are shareware programs that allow you to plug in a model number and get the specs, but wouldn't the Macintosh just be the coolest with this feature?

ANDY ZEVON
New York, New York

*Yes, indeed. While I couldn't find anything that lets you view processor speed in the About This Macintosh box, how about being able to view it on the desktop in the Control Strip? Chris Modules 1.5 ($10 shareware, Chris Owen) allows you to add various modules to your Control Strip, one of which, Processor Speed, displays how fast your Macintosh is going. The program is available from the Macworld Online software library on the Web (*http://www.macworld.com*) and on America Online (keyword* Macworld*).—Ed.*

My PC Can Beat Your PC

I FOUND YOUR ARTICLE "IS THE MMX Pentium a Threat?" an interesting examination of Intel's multimedia chips (*News*, February 1997). However, I don't think it is fair to say that the PowerPC has met its multimedia match.

First, MMX Pentiums have twice as much internal cache as their predecessors. This accounts for a substantial part of any speedup noticed in your tests. As the PowerPC cache advantage is halved, its superiority in processor-intensive tasks is reduced. It's no wonder that the MMX Pentium trounced its non-MMX cousin.

The second major difference is the bus speed running between the chips and their memory. Pentium machines traditionally run at either 60MHz or 66MHz, while Power Macintoshes run between 40MHz and 50MHz.

Last, Power Macs are fighting with one arm tied behind their backs. Apple still has a lot of emulated code in system software, which slows down practically any task. While the emulator has become faster over the years, it is actually the switching back and forth between native and emulated tasks that slows things down the most.

Once you account for all these effects, MMX is no longer a big deal. Really, the Intel marketing department is Apple's biggest threat.

PATRICK TAYLOR
Halifax, Nova Scotia, Canada

Multifunction Madness

MY HOME-OFFICE SPACE IS LIMITED to my library/den. To save space, multifunction units (printer, scanner, fax, copier, and so on) are now available for PCs, but I have been unable to find such a unit for my Macintosh. Are they available or in the offing?

HANS G. ENGEL, M.D.
Mission Hills, California

Unfortunately, the situation hasn't changed over the last year. The multifunction devices that you've heard about are still designed for Windows only, with no comparable Mac products in the works. See "Home Office Blueprint," May 1996, for more information.—Ed.

Letters should be sent to *Letters*, Macworld, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (*70370,702*), MCI Mail (*294-8078*), America Online (keyword *Macworld*), AppleLink (*Macworld1*), or via the Internet (*letters@macworld.com*). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*.

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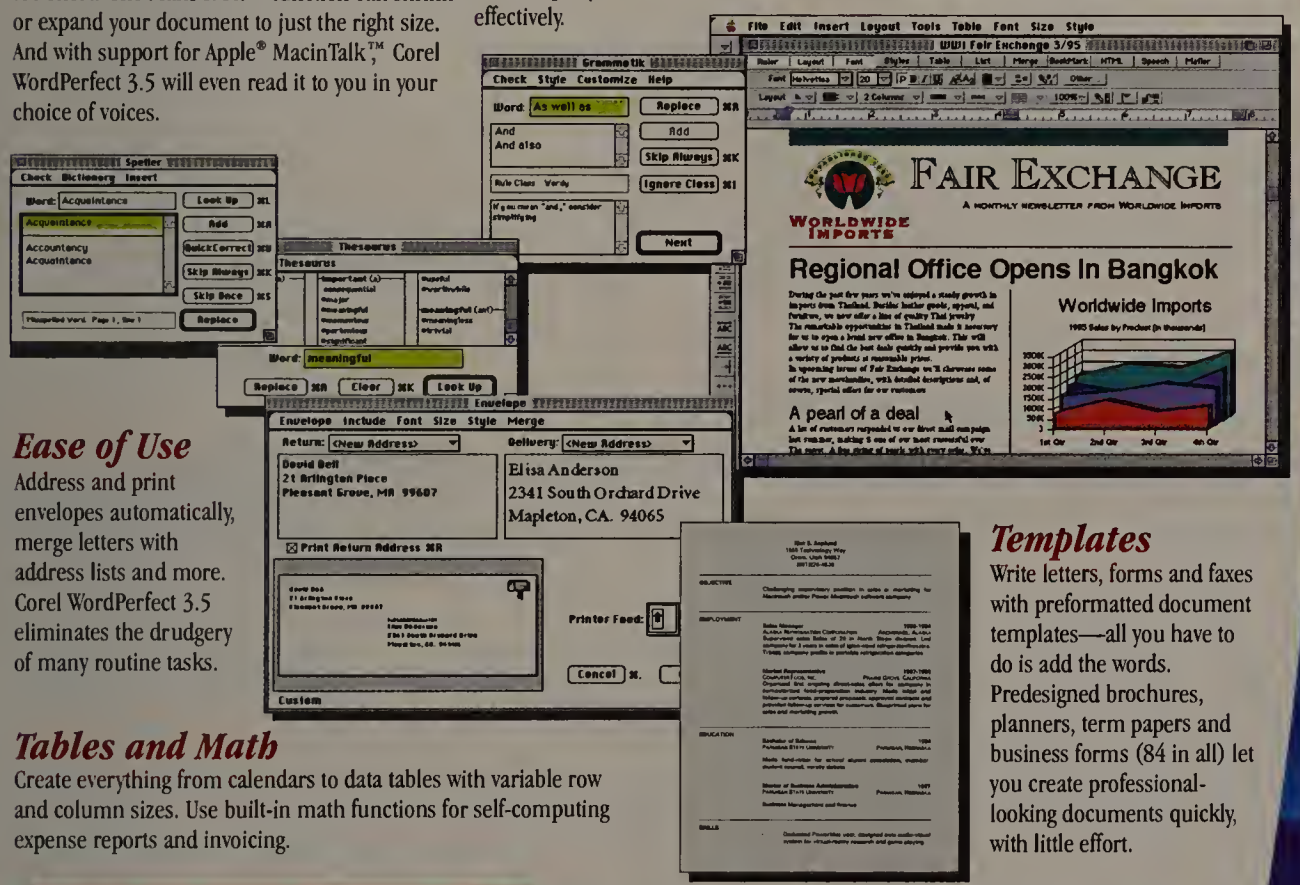

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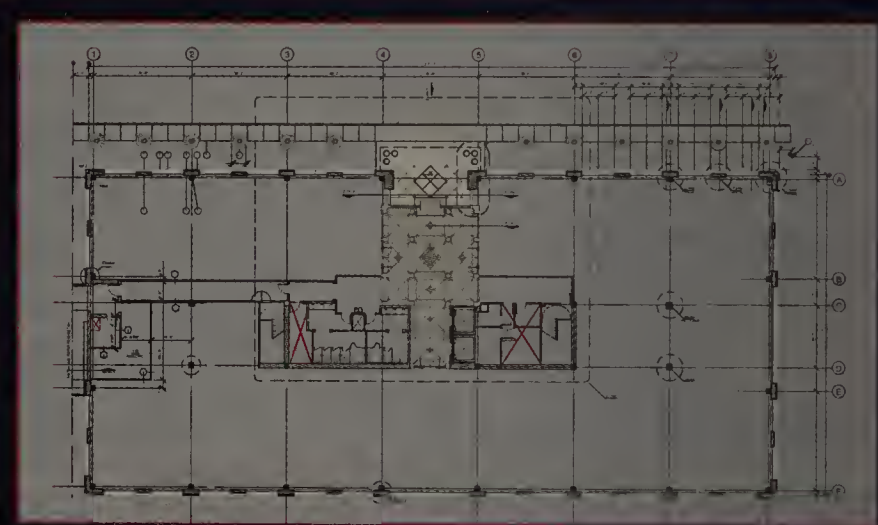

Way to Design

—Audience Vote at the Designers CAD Shoot-Out

The general-purpose MiniCad went toe-to-toe against industry-specific CAD programs nearly six times as expensive—and came out on top—at the first-ever Designers CAD Shoot-Out for Architectural CADD Systems. In this advent of "architecture as a spectator sport," the audience at Boston's World Trade Center awarded MiniCad 6, fittingly, six first-place awards:

- Most Cost Effective
- Easiest to Use
- Best at Cross-Platform Operation
- Best Floor Plans
- Best Elevations
- Best Sections

MiniCad also placed a close third in the Overall Winner category (garnering 21% of the audience vote compared to Arris' 25% and ArchiCad's 24%), beating out AutoArchitect, Microstation Triforma, AllPlan, Architrion, and DataCAD. Even more impressive: MiniCad was the only software program running on both a Macintosh and a Windows machine during the event. This recent success is not surprising. For years MiniCad has been the top-selling CAD program on the Macintosh, winning industry awards worldwide. And the reviews for the recently released Windows version have all been emphatic.

To find out more about the CAD Shoot-Out or how professionals in more than 80 countries have used MiniCad—designing everything from a guitar to a zero-gravity manufacturing device; building houses, luxury high rises, shopping centers, and hockey arenas; planning the stage set and lighting for worldwide Metallica tours; even helping reconstruct Shakespeare's historic Globe Theatre—check out our web page (www.diehlgraphsoft.com) or call 1-800-413-0935.

MiniCad has a suggested retail price of $795, and it comes with 18 months of free tech support and a 30-day money-back guarantee from participating dealers. MiniCad 6 supports Windows 95, NT, 3.1, and Macintosh OS.

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Above building designed by David A. Bruhnke, Herring & Trowbridge Architects.

MiniCad 6 —The only thing small is the price.

Circle 46 on reader service card

by Adrian Mello

The Great Computer Bargain

A NEW WAVE OF FAST, INEXPENSIVE MACS MAKES IT A GREAT TIME TO BUY

ONE COMPUTING TRUISM has held for 20 years: performance and capacity continually increase while prices decrease. We're all used to this phenomenon, and we revel in the quick advances while we bemoan the fact that the hardware we purchased a year ago inevitably loses some of its luster compared with today's shiny new products. Every once in a while the planets align and buyers are in the market for a new computer at precisely the right time—when the price/performance ratio takes a big leap forward. That's the moment many of us await to answer the siren call of a faster, more powerful computer.

Well, guess what—the moment has arrived. Apple's latest PowerBook and desktop computers demonstrate how far Mac models have come recently (see "PowerBook with a Punch" and "More Mac for Your Money," in *Macworld*, April 1997). These machines offer big improvements in price and performance over previous Apple Macintoshes. What's more, most are compelling computers with a much improved mix of features and capabilities. As *Macworld* noted during the past year, Apple wasn't keeping up with its new competition, and Apple products didn't win many *Macworld* Editors' Choice awards. Admirably, Apple has responded by improving its products.

It's amazing how many more choices are now available. If you take a look at the *Mac Superguide* in this issue, you'll count 41 models from 7 vendors. Not long ago you could find only one or two models that fit your needs. Now you're likely to find several, and you'll have to work a bit to discern the best fit.

The Price/Performance Ratio

It's also amazing how much more performance you get for your money with today's Mac models. For comparing Mac prices over time, $2500 is a good figure. A year and a half ago when the PCI Power Macs were introduced, the Power Mac 7500 had a suggested retail price of $2800. While this is about 12 percent more than $2500, the 7500 merits comparison because it was the primary midrange Mac available at the time.

As of April, the midrange position in Apple's lineup is represented by the Power Mac 7300/180 (which incidentally is *Macworld*'s Editors' Choice for best office system). At $2399 the Power Mac 7300/180 costs $400 less than the 7500, yet it's twice as fast in Macworld Lab's core performance index. Furthermore, you get twice the RAM, two to four times the storage capacity, a faster CD-ROM drive, and numerous other improvements. I don't believe Apple has ever before made such a dramatic leap forward in price/performance.

HANK OSUNA

Competition

The improvement in prices is mostly a result of competition. Apple is not the only vendor offering great price/performance values (for a complete comparison of 29 lower-cost models, see "Super Mac Values," in this issue). Clone makers such as APS, Motorola, Power Computing, and Umax now offer well-priced systems with excellent performance. The clone companies deserve the lion's share of the credit for driving prices down while driving performance up over the last year.

Competition continues to improve price/performance, as evidenced by the recent flurry of price reductions by most clone vendors.

If you're on an especially tight budget, you now have a good selection of PowerPC-based Macs for around $1500 from several vendors. For example, for $1495 you can now buy a computer that's as fast as last year's office systems that cost an additional $1000. What's more, there are now ten systems available for less than $1500—and a couple of these are less than $1300. By this time next year you'll be able to buy a bare-bones Mac for less than $1000.

The Time Is Right

I wouldn't hold off buying a Mac just because prices may go a bit lower or because performance will continue to improve. Most Mac vendors have now put their best foot forward, and I don't expect to see huge gains in price/performance in the under-$2500 class of computers in the coming year. And there's no reason to worry about future compatibility with Apple's next-generation operating system, code-named Rhapsody. Any new Mac you purchase should be able to run Rhapsody when it arrives sometime next year.

So if you've been waiting for the best time to buy a new Mac, this is it. Let me know what you think about the latest Macs at *mello@macworld.com*. m

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So what does the future of the Mac® OS look like? For a glimpse, check out our newly released Mac OS 7.6. It's faster than ever before—so you can start your Mac, launch applications, save files and print up to 40% faster.

The Mac you buy today won't be obsolete tomorrow. Because Rhapsody will be compatible with all currently shipping Mac OS systems.

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Mac OS also has the latest version of Apple QuickTime,® the industry standard for multimedia creation and delivery. And it makes upgrading easier: with one CD-ROM and a streamlined installation process.

Intrigued? Then you'll love what comes next. Because we're hard at work on the next version of the Mac OS, code-named Tempo. Right from the start you'll notice a new look, with beveled buttons, icon drop shadows and other 3-D enhancements to the desktop. Tempo will dramatically improve system responsiveness by incorporating multitasking, multi-threaded functionality and native PowerPC™ capabilities directly in the OS. So you can run multiple applications more smoothly, and launch new applications while files are copying in the background. Tempo extends our Internet capabilities with easy

The Mac OS Report. One in a Series.

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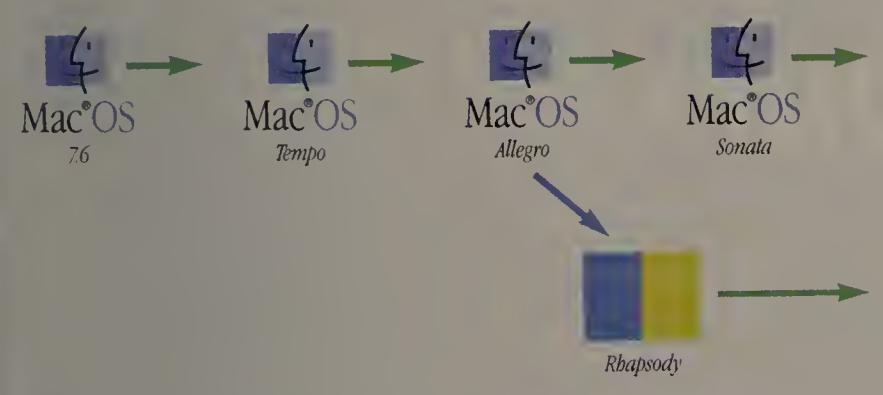

Apple's complementary operating systems—Mac OS and Rhapsody—allow you to choose the system that best meets your needs. They also allow you to decide when it's time to make the transition.

setup, personal web sharing and built-in Java.™ And it will help you be more organized, by reducing on-screen clutter with spring-loaded folders and pop-up windows for frequently used items.

Of course, Tempo also paves the way for further updates to the Mac OS. Because there's much more to come.

It will be the NeXT thing.

When we began defining a new software architecture that would take us into the future, we had two clear objectives: to enhance our traditional strengths, and to create an operating system that would leapfrog the competition, setting standards into the next century.

Enter NeXT.® By acquiring NeXT Software and adopting their kernel-based architecture, Apple can offer advanced system services such as true multitasking, protected memory and symmetrical multiprocessing. We have also strengthened our position in client-server and Internet/Intranet markets. And NeXT's object-oriented development environment and powerful tools such as WebObjects™ and Enterprise Objects Framework™ give us clear advantages in the creation of new solutions.

Merging NeXT and the Mac OS will create a next-generation OS that will give our competitors something new to catch up to. It will be an OS that helps developers create breakthrough applications by allowing greater experimentation and efficient reuse of code. It will include the best of our graphics technologies, such as ColorSync® and QuickDraw® GX. And we plan to adopt the Adobe® PostScript® imaging model as well. It will fully support the QuickTime Media Layer. It will provide industrial-strength reliability, performance and ease of use. And it will be an ideal platform for publishing, multimedia and Internet applications yet to come.

What is the name of this new OS? Its code name is Rhapsody.

It will be an Apple thing.

Rhapsody will leave other operating systems in the dust. But not Apple customers. To start with, Rhapsody will enhance the general look and feel of today's Mac OS interface. It will support all currently shipping Mac OS-based systems. It will run the vast majority of existing Mac OS applications by hosting the complete Mac OS on the Rhapsody kernel.

In short, Rhapsody will run your existing applications and utilities, read your files, recognize your current fonts and extensions and play your movies and sounds. Rhapsody will deliver the kind of technology you expect from Apple. The kind of technology that appeals to anyone who requires the highest performance for publishing, Internet and multimedia authoring, and scientific and technical work. The kind of technology that appeals to people who like to, well, get things done.

You can.

What does all this mean? It means you can do everything you're used to doing now, plus a few things you might not yet imagine. It means you can buy a Mac today and not worry about its compatibility with Rhapsody tomorrow. It means Rhapsody won't just be a new way to use a *Macintosh*—it will define an entirely new way to use *computers*. You can learn more by visiting us at www.macos.apple.com or by calling 800-538-9696 for information by fax.

The world's most intuitive and easy-to-use operating system will remain just that. With regular system updates and enhancements, the Mac OS will take you well into the future.

The acquisition of NeXT provides Apple with additional strengths in performance, reliability, network management and rapid application development.

Mac OS 7.6 extends Apple's leadership in graphics and multimedia by bringing together the latest versions of Apple QuickTime technologies, collectively known as the QuickTime Media Layer.

Adobe PostScript

Apple intends to adopt the Adobe® PostScript® imaging model for Rhapsody and transfer the best of our existing graphic technologies, including ColorSync and QuickDraw GX.

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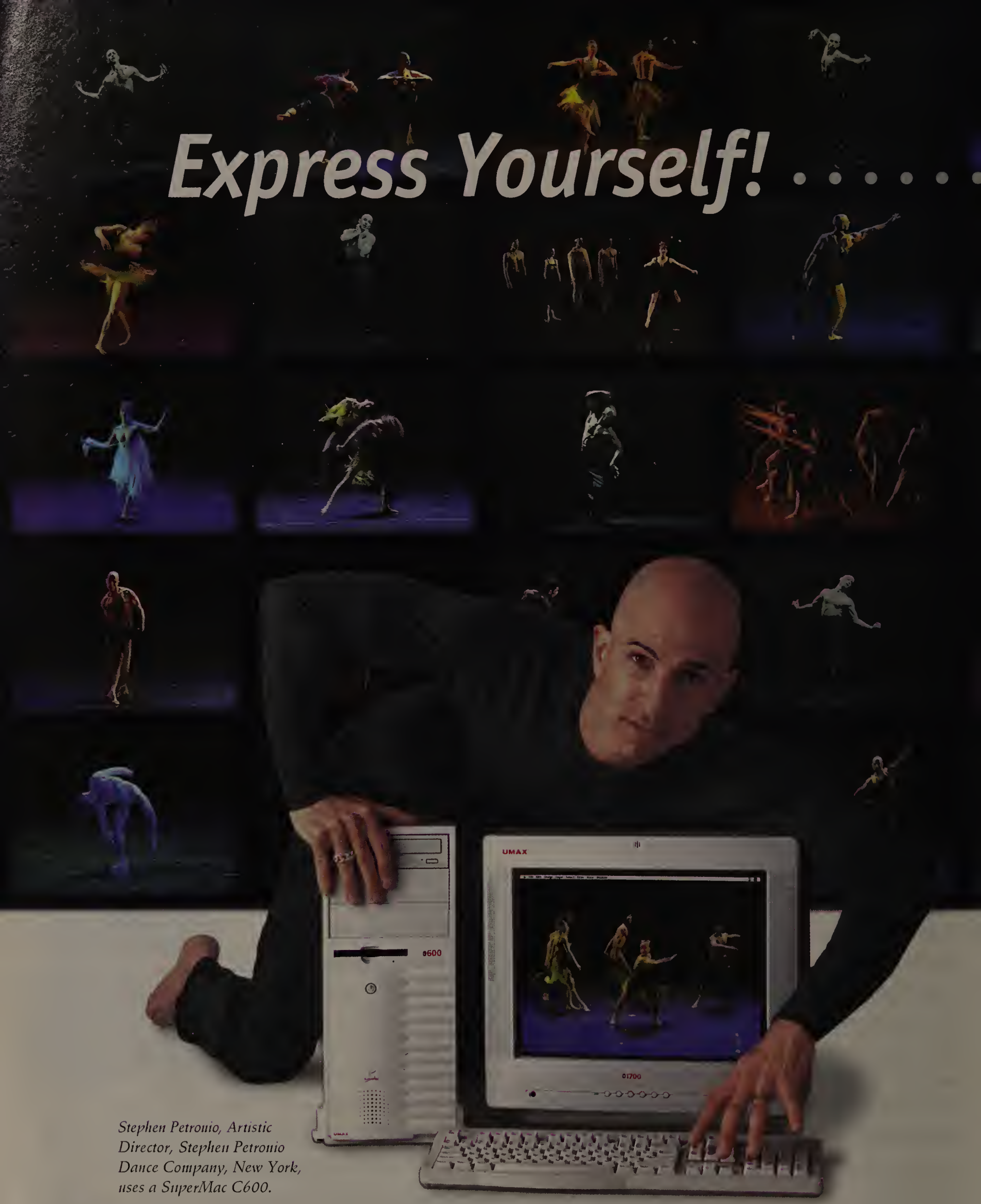

Stephen Petronio, Artistic Director, Stephen Petronio Dance Company, New York, uses a SuperMac C600.

Mac™OS

You'd be amazed what people are using SuperMac C600 computers for these days.
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- Easy-to-use • Affordable

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- Adobe Pagemill™
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- NOW Utilities
- NOW Up-to-Date & Contact
- Cypress Research Megaphone
- Power FPU
- MINDSCAPE® Grolier® Encyclopedia
- MICROMAT TechTool™ Pro
- NowWhatSoftware 3D Talking Globe
- NowWhatSoftware The Cities Below™
- FWB CD-ROM & HDTool Kit™ PE

3 **SuperMac High-Upgradeability**

SuperMac J700

SuperMac C600

SuperMac S900

MacWeek

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PowerPC™

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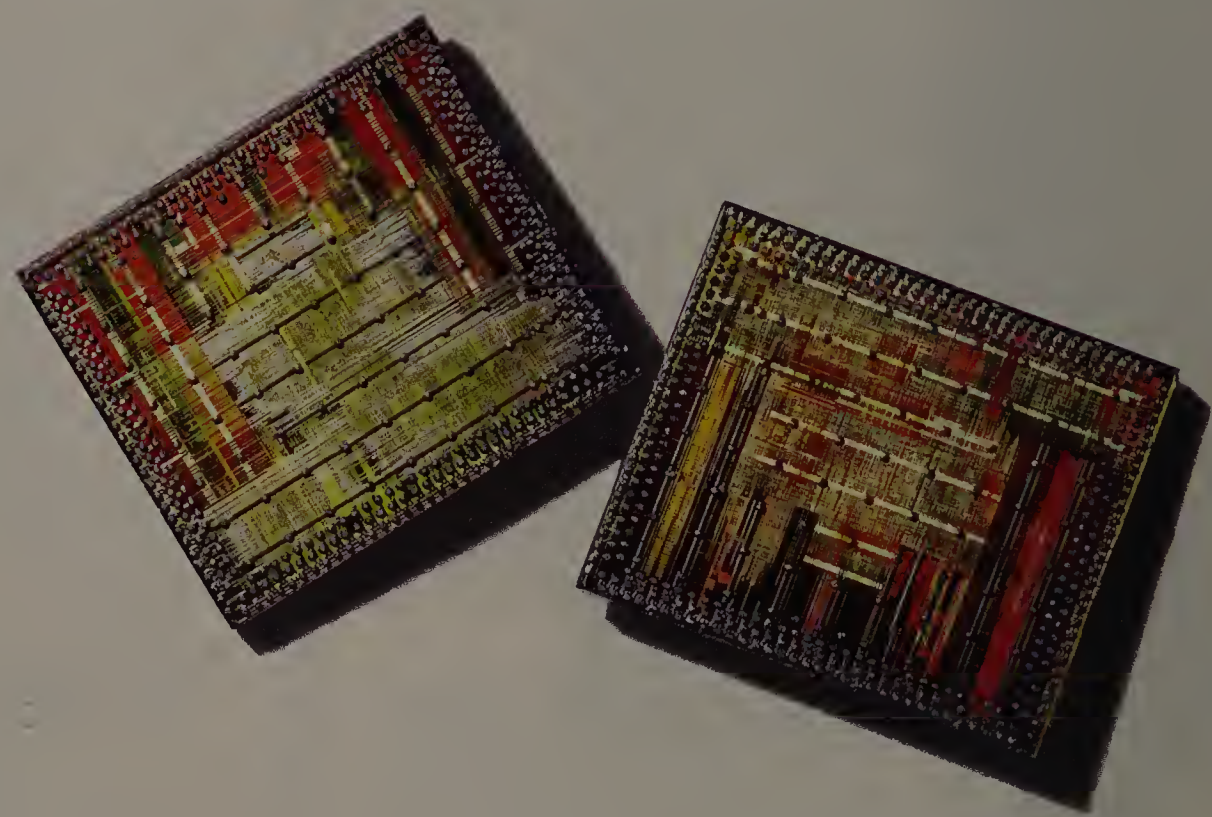
News

systems

New PowerPC CPU: A Step Ahead

G3 SERIES OFFERS MORE SPEED THROUGH DIRECT CACHE ACCESS

by Tova Fliegel



KEVIN CANDLAND

Good news for the Power Macintosh: the Motorola RISC group and IBM Microelectronics continue to propel the platform forward by tangibly boosting performance in each generation of PowerPC CPUs. Coming up to bat is the G3 series, unveiled to engineers in February and set to ship in machines by midyear. (G3 is the code name for the new family of chips; the final name for each implementation should be unveiled in April or May. Pricing has not yet been determined.)

Judging by its innovative design, the first of the G3 series not only promises higher speeds but will also take better advantage of high-speed cache to further boost performance. And the G3 accomplishes this while consuming less power than preceding generations of much slower chips. Such innovation keeps the PowerPC one step ahead of Intel as that company pushes the MMX Pentium (see "Is the MMX Pentium a Threat?" *News*, February 1997) and soon-to-follow Klamath Pentium Pro CPUs.

Focus on Faster Cache

Motorola and IBM will introduce the first of the G3's as two processors. One G3 version has the same number of connectors (called *pinouts*) as existing 603e's and 604e's for easy upgradability: system makers can simply plug the new chip into existing motherboard or CPU card designs.

The second version of the G3 has extra pinouts to take advantage of high-speed cache and will include an on-chip Level 2 (L2) cache controller that can be configured to support 256K, 512K, or 1MB two-way cache. Using the controller, the G3 with extra pinouts can directly access the L2 cache at very high speeds, whether that cache is on the motherboard or CPU card.

With the direct cache access on this G3 version, the CPU and cache can communicate at speeds of up to 150MHz. Today's PowerPCs, as well as the G3 without the extra pinouts, can exchange data only as fast as the Mac's bus speed, which on most Macs today is between 33MHz and 50MHz.

Like the 604e, the G3 uses dynamic branch prediction, which lets the CPU juggle the order in which it computes instructions based on what it predicts is the most efficient order for the series of calculations awaiting execution. However, the G3 adds to this a buffer for storing

branch instructions, so if the G3 correctly predicts what instructions it needs to process next, it has those instructions immediately available. In other chips, the chip has to take the extra step of loading the instructions once it knows it needs them.

What all this means is more speed coming straight to the desktop.

Fast Speed, Low Power The first G3's will run at 250MHz, but faster speeds are expected soon, with 300MHz likely this year. The G3 can run from two to eight times the Mac's bus speed.

Thus, on a Power Mac with a 50MHz bus, such as the new Power Mac 7300/200, a G3 can run as fast as 400MHz (assuming that Motorola and IBM deliver a 400MHz G3). As Mac bus speeds increase to 66MHz later this year, and perhaps to 83MHz, the G3 speed could increase dramatically.

At 250MHz, the G3 runs off an amazingly low 5 watts of power (the sustainable maximum energy use, according to Motorola's estimates); in comparison, a 200MHz 604e uses 19.5w—nearly four times the power—while a 200MHz MMX Pentium for desktop PCs uses 15.7w and a 166MHz MMX Pentium for notebook PCs uses 7.8w.

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Apple Layoffs

ON MARCH 14, APPLE PLANS TO ANNOUNCE A SUBSTANTIAL REDUCTION IN ITS WORKFORCE. FOR THE LATEST DETAILS ON THE LAYOFFS—AND WHAT THEY MEAN FOR MACINTOSH USERS—SEE MACWORLD DAILY AT *HTTP://WWW.MACWORLD.COM/DAILY/*.

systems

Mac License Raises Questions

MOTOROLA STANDARDS UNEVENLY APPLIED

by Stephen Beale

Now that you can buy Macintosh systems from so many different manufacturers, how can you be sure that your vendor can stand behind its products over the long haul? Can we leave it to Apple, IBM, and Motorola—the three companies empowered to license the Mac OS—to carefully screen their licensees?

The early answer, at least from Motorola Computer Group (MCG), is not reassuring. In November, the manufacturer quietly signed up a small Austin, Texas, company called PowerTools (512/891-0646, *http://www.pwrtools.com*) as one of the first licensees for its Mac OS systems. PowerTools now sells Mac systems—based on a Motorola motherboard—under the Infiniti label (no relation to the car company); see "Super Mac Values," in this issue, for details on the Infiniti system.

Were Standards Met? According to MCG executives, companies must meet certain standards that Motorola set to become Mac OS licensees. These include an established distribution channel, a good credit record, and strong technical support capabilities, says Tina Kelley, MCG's worldwide marketing manager for Macintosh boards. Motorola also examines such factors as engineering talent and the vendor's targeted market, she says.

No one has accused PowerTools of legal wrongdoing, but the company appears to fall short of Motorola's standards. A little more than a year old, PowerTools has no engineers on its 30-person staff, admits CEO Victor Wong. When it first opened its doors, PowerTools lacked even its own telephone system or order-processing computers, Wong says. Instead, the company rented parts of PBX and order-processing systems used by Bottom Line Distribution, a Macintosh mail-order outlet with which PowerTools also shares office space. As of late February, the company still used Bottom Line personnel to take orders.

Wong says that he is one of six original investors in PowerTools. Another investor—and the company's president—is David Goldman, who owns Bottom Line Distribution and has also operated two other Austin-based mail-order outlets, Mac Products USA and DGR Technologies. While PowerTools and Bottom Line share facilities and Goldman's common ownership, Wong insists that they operate as separate companies. Before launching PowerTools, Wong worked for Goldman at Bottom Line.

When PowerTools first began advertising its systems four months ago, they were not actually available for sale, Wong admits. Macworld Lab requested Infiniti systems for testing in November but did not receive one until late January, despite promises from Wong that the systems would be submitted soon after they were announced.

Today, Wong says, customers who order PowerTools' advertised systems will find that they are available, except in cases where the customer wants a nonstandard component, such as a different disk drive.

Accelerator Woes In its brief history, PowerTools has also announced numerous Mac-based accelerator products that have never actually shipped. For example, in August 1996 PowerTools announced a series of single-, dual-, and quad-processor PCI cards—actually designed and manufactured by another company, Total Impact—along with single- and dual-processor daughtercards, all of which were supposed to ship at the end of that month. Again, Macworld Lab requested these products for evaluation, but they were never submitted, despite promises from Wong that he would provide them for testing.

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PHOTOGRAPH AND SCREEN IMAGE BY KEVIN CANDLAND

PowerTools' Infiniti systems use a Motorola StarMax motherboard.

Wong now admits that the cards never shipped, but he hopes to ship a single-processor daughtercard accelerator in the near future. One problem, he says, arose from subtle differences among various Power Macintosh models that made it difficult to ensure compatibility with the accelerator cards.

Now that he's joined the ranks of Mac system vendors, Wong promises to be a good corporate citizen who won't announce products he's not in a position to ship. "We don't want to do that ever again," he says, "not that we ever did it intentionally."

Outside Resources Since signing the licensing deal with MCG, PowerTools has contracted with three independent manufacturing facilities, two in Chicago and one in Austin, to produce its Macintosh systems. While it's common in the PC market for companies to sell systems made by others, this is a new phenomenon in the Mac market. APS Technology, for example, is another Motorola licensee that assembles its own systems at a facility in Kansas City.

Wong says that the outside manufacturing facilities allow him to focus on other areas, such as sales and marketing. He also defends the lack of in-house engineers. "We don't have to grab the brightest minds in the market and pay them the huge salaries they deserve because our engineers all wear Motorola badges," he says, alluding to the fact that Motorola designed the motherboards used in the PowerTools systems. (However, Motorola employees do not work for PowerTools.) In addition, he says, PowerTools sometimes hires engineers on a contract basis if such skills are needed.

Inadequate Screening So how did a company with such limited resources and a spotty product-development history become a Motorola licensee?

The PowerTools deal was arranged by a regional sales manager in Texas and was apparently approved without the knowledge of upper-level managers. Asked by *Macworld* for a comment on the PowerTools license in November, MCG executives first insisted that no such deal had been signed. Only later did they learn that lower-level managers had approved the deal and that the contract was legally binding.

MCG executives now admit that the PowerTools deal went through before adequate screening and negotiating procedures were put into place. Today, license negotiations are handled solely by MCG's corporate office in Tempe, Arizona.

MCG executives now say they will scrutinize potential licensees more closely. Tina Kelley, speaking broadly about the company's revamped licensing procedures, says Motorola is also considering contingency plans for situations where its licensees go out of business or otherwise cannot adequately support the Motorola systems.

systems

Motorola, Umax Get Be OS License

WILL INCLUDE BE OS IN MAC SYSTEMS

by Galen Gruman

Motorola Computer Group (800/759-1107, *http://www.mot.com*) and Umax Computer (510/226-6886, *http://www.supermac.com*) have announced pending licensing deals with Be (415/462-4100, *http://www.be*

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The Mac Portable for the 90s

VERTEGRI SYSTEM USES TANZANIA BOARD

Apple wants a monopoly on portable Macs, so it won't let anyone create a PowerBook clone. But a small start-up company in Vancouver, Canada, has found a way around that restriction. Vertegri Research (604/688-6792, *http://www.paulgossen.com*) has designed a portable Mac called the imediaEngine that is based on the Tanzania motherboard used in Apple's Power Mac 4400 and Motorola's StarMax line. (Power Computing is investigating a similar approach, using the Alchemy motherboards found in its PowerBase line and Apple's Performa 6400 line.)

Vertegri refused to show *Macworld* a prototype or allow us into their offices. But based on information from the company, the system appears more reminiscent of Apple's original, heavy Macintosh Portable than a lightweight notebook. Due to ship in April in limited quantity in the United States and Canada, the imediaEngine uses the PowerPC 604e CPU at speeds of up to 240MHz, so it rivals the performance of a Power Mac 9600/233 or PowerTower Pro 225. But it doesn't have batteries and weighs 12 pounds, double the weight of most notebooks. Interesting features include a drive bay that accepts standard 3.5-inch drives, and a metal case, which the company says is more durable than the plastics in Apple notebooks. One model features 14-inch LCD screens running at the 1028-by-768-pixel resolution commonly used on a 19-inch monitor. One omission is a PC Card slot, since Apple won't give clone vendors the required software.

The vendor says its portables are aimed at high-powered multimedia presentations or engineering and scientific work. While Vertegri is exploring battery options, the company admits the system is not meant for use in planes or trains. Instead, it's meant as a movable desktop.

Vertegri is a spin-off of the Canadian consulting group Paul Gossen & Associates, which has sold Power Computing and DayStar systems for several years. The company has a small engineering staff and has contracted a Vancouver-area manufacturing facility to make the portables. Vertegri has a Mac OS license from Motorola Computer Group, which sells Vertegri the Tanzania motherboards. While the company refuses to say how many systems it will produce in a year, it says it considers this a niche product and so will not produce high volumes. Prices range from $5000 to $8000.—GALEN GRUMAN

JOHN BLECK

.com) that would put the Be OS, in addition to Apple's Mac OS, on Mac systems from the two companies. Motorola and Be are also collaborating to ensure that the Be OS will take full advantage of future PowerPC CPU designs. (Motorola Computer Group does not design the PowerPC chip; the separate Motorola RISC Microprocessor Division does.)

Be says Motorola is exploring the possibility of making the Be OS work on Motorola's PowerStack line of Unix workstations, although the two companies have not committed to doing so.

Motorola began discussing a possible Be deal in November, before Apple rejected the Be OS as the foundation for the next Mac OS and instead bought Next and its OpenStep OS. Privately, officials at several Mac makers indicate that the Be OS is a hedge against the possibility of Apple's Next-based Mac OS effort failing, as Apple's Copland OS effort did last summer.

Motorola and Umax are the second and third Mac makers to include the Be OS on their systems; Power Computing became the first in November 1996.

The Be OS is expected to ship by April in an incomplete preview edition and will be included with Motorola and Power Computing systems at that time. Umax hopes to offer the Be OS sometime this year.

Officials at Be say that more licensing deals are in the works with other Macintosh makers. One possible licensee is IBM Microelectronics; Be acknowledges that the two companies have discussed a potential alliance. IBM has no plans to make its own Macs, but it does have the right to license the Mac OS to other companies that buy IBM PowerPC CPUs; a deal with Be would allow IBM to include the Be OS as part of its PowerPC sales.

In related news, DayStar Digital (770/967-2077, *http://www.daystar.com*) announced multiprocessing support for the Be OS.

DayStar's nPower multiprocessing technology is licensed by Apple Computer, Umax Computer, and Newer Technology, which could, if they signed agreements with Be, bundle the OS with their multiprocessing systems. DayStar says the Be OS can now run on up to four processors.

The Be OS is a new operating system designed for media-rich, interactive content-design applications. It is a full symmetric multiprocessing system (able to use multiple processors in a single system) that offers full preemptive multitasking, multithreaded operation, protected memory, and an object-oriented design. (For more information on the Be OS, see "Time for a New OS?" *Macworld*, February 1997.)

online

Bursting the Web TV Bubble

INTERNET BROWSING ON THE FAMILY TV HAS NOT CAUGHT ON

by Wendy Sharp

Six months after the onslaught of announcements that various companies would soon bring the Web into living rooms via television, the bandwagon seems to have come to a grinding halt. While products by Sony, Philips Magnavox, and Bandai Digital Entertainment are in stores now (see *Reviews* and *NetSmart* in this issue), others—including the Zenith NetVision and Samsung's Internet TV—have been delayed or canceled altogether.

Slow and Slower One reason is the technical obstacles facing the consumer electronics companies. Consumers used to television may be surprised by the Web's slow pace, and the bandwidth problem is not one that is easily solved.

Even with a fast modem, using the Web can be painfully slow, because Web speeds are controlled not just by the modem but by the phone lines and by the servers and connections that make up the Web. ISDN lines, fiber-optic connections, and cable modems may all present partial solutions, but in the near future their prices put them out of range for companies looking for low-cost answers.

ROBERT PERRY

The Pippin @World from Bandai is one of the few available Web TV products.

A number of companies, including Mitsubishi and Sharp, announced products that would use a 28.8-Kbps or 14.4-Kbps modem, but these simply may not be fast enough. Both Sony and Philips Magnavox are using 33.6-Kbps modems, with plans to upgrade to 56-Kbps ones when they become widely available.

What You See Isn't Good A second problem is the quality of the display. Televisions were not designed to display high-quality graphics, and companies are using a variety of methods to make HTML content readable and attractive on a television set. Some are more successful than others.

Bandai's Pippin @World adjusts images so that some elements look reasonable on a TV screen, but other elements, including Web addresses, are very hard to read. Sony's WebTV and ViewCall America, meanwhile, solve the display problem via proprietary networks. They process the images in their servers and then send the images on to the end user. But imagine if your Macintosh required you to use AOL—or worse, eWorld. If you don't like the service, your up-front investment of $400 or so is wasted.

Do You Buy It? Finally, companies may be justifiably concerned about the market for these products. A recent Dataquest survey found that 93 percent of respondents were not interested in Internet television. Although a Sony spokesperson described the company as "bullish" on its WebTV Internet Terminal and said that the company was satisfied with current sales, the optimism of one analyst who predicted a million units sold in the first year seems to have been extravagant.

Is Internet TV doomed to go the way of interactive TV? Maybe not. WebTV is announcing innovations, including VideoFlash, a technology that will let users download 30 seconds of video in 3 minutes with a 33.6-Kbps modem or in 1.5 minutes with a 56-Kbps modem. This technology and others may attract new users. And other companies, including Boca Research and Hitachi, plan to ship set-top boxes in the near future.

online

Page Builders Enter Next Generation

FOUR PROGRAMS USE JAVA, DATABASES

by Tom Negrino

The next wave of Web development tools is almost upon us, bringing the holy grail of WYSIWYG Web design ever closer.

Like the recently released NetObjects Fusion (see *Reviews*, in this issue), GoLive Systems' (415/463-1580, *http://www.golive.com*) CyberStudio promises pixel-level precision in placing text, graphics, and multimedia elements on a Web page, and provides automatic link management.

Unlike Fusion, CyberStudio always gives the user access to the underlying HTML in a document, making it better suited for shops where more than one person works on a site's production. The program also has a plug-in architecture, which allows other companies to write add-ons, such as database connectivity. The $349 package also includes a JavaScript editor.

Jumping with Java Two other products take a very different approach to WYSIWYG. Instead of tweaking HTML until it screams, they render a Web page using Java.

With Texture 1.1 from FutureTense (508/263-5480, *http://www.futuretense.com*), designers can create pages using QuarkXPress-like layout tools, including text that flows from one column to the next. But even more interesting is that the $495 package creates pages built almost entirely out of links to text and graphic objects, so a page's content can be easily updated without requiring any adjustments to the layout.

Coda from RandomNoise (415/437-0321, *http://www.randomnoise.com*) is quite a bit different; it's written entirely in Java, so it looks and works exactly the same on Mac, Windows, or Unix machines. Besides its WYSIWYG layout ability, the $495 package allows you to add many user-interface elements to your Web pages, such as buttons, pop-up windows, and scroll bars. The software offers text, graphics, and animation tools, and it lets users employ and antialias any Type 1 or TrueType font within their designs. Objects on Coda pages can also use a proprietary messaging system to communicate with each other in a more robust fashion than JavaScript ordinarily allows.

One drawback of both Coda and Texture is that Web surfers need viewer programs to see the pages you create. If the user doesn't have the viewer installed as a plug-in, it can be automatically downloaded as a Java applet. But it's still an extra hassle for users visiting your Web site.

Make Your Site Submit Managing the elements that go into a Web site can be an uphill struggle, and ProVue Development (714/841-7779, *http://www.provue.com*) conquers the problem with its new SiteWarrior, based on the fast and powerful Panorama database. Designed for the WYSIWYG-is-for-wimps crowd, the $595 program lets you build and maintain large sites with page templates that provide global control over headers, footers, banners, and tables of contents. Automatic link management adjusts all links when you rename pages or move page elements. The built-in image database catalogs all your GIFs and JPEGs. You can also search and replace across your entire site. When you're done building your site, you render it up to your Web server.

CyberStudio and Coda are due by the end of March, with SiteWarrior to follow by June. Texture is shipping now.

graphics

Painter Meets PowerGoo

FRACTAL DESIGN AND METATOOLS PLAN MERGER

by Cathy Abes

The natural-media tools of Fractal Design and the cutting-edge special effects of MetaTools will soon be under the same virtual roof. In February, the two developers, both known for their innovative graphics software, announced plans to join forces and create a new company that would have earned $65.2 million in revenues for the calendar year 1996. Possible names include MetaDesign and FracTools.

MetaTools' chief executive officer, John Wilczak, will become the chief executive officer of the new company. Fractal's president and CEO, Mark Zimmer, will become the company's chief technical officer; he will work closely with Kai Krause, MetaTools' chief design officer, and Sasha Migdal, MetaTools' chief scientist. Tom Hedges, Fractal Design's chairman, will be the chief systems architect.

Merger or Acquisition? Although Wilczak and Zimmer insist the agreement represents "a merger of equals," others outside the company are terming it an acquisition. On MetaTools' Web site, Wilczak even admits that the new company will be 60 percent MetaTools and 40 percent Fractal. The new board of directors will also be heavily populated by MetaTools executives, with only three out of nine members representing Fractal.

One source close to Fractal claims that Zimmer had been trying to sell the company since late last year. Eric Hautemont, who was head of Ray Dream, the 3-D developer that Fractal bought last year, left Fractal several weeks before the merger was announced, reportedly in opposition to the plan.

MetaTools offers such programs as Kai's Power Tools, KPT Bryce, and PowerGoo, while Fractal Design is known for its natural-media programs, including Painter, Detailer, and Expression. While Fractal has stayed focused on the professional artist, MetaTools has repeatedly reinvented itself, going from Adobe Photoshop plug-in maker to standalone–graphics program developer and most recently consumer-product developer.

Wilczak says the new company will deliver a range of technologies involving the creation, manipulation, and editing of 2-D and 3-D graphics, animation, video, and sound.

The new company will also incorporate the resources and technology of Real Time Geometry, a company MetaTools acquired in December 1996. Plans, according to Wilczak, include bringing new

ILLUSTRATIONS BY JOHN BLECK

technologies to the consumer market, as well as continuing the development of MetaWorld, a software interface that would sit above the operating system and provide a more visual way to access the computer, which he hopes to see sometime in 1998.

The new company's corporate headquarters will be in Carpinteria, California, where MetaTools is located. Fractal Design staff and resources will remain in Scotts Valley, California. The merger is expected to become effective in the quarter ending June 30, 1997.

storage

DVD Drives Come to the Mac Market

FULL-LENGTH, FULL-SCREEN MOVIES

by Cary Lu

Apple's recent announcement of DVD support for most of its product line signals the arrival of the DVD drive as a consumer product. After demonstrating a modified Performa 5400 as a DVD prototype, Apple announced that the first DVD-enabled Macintosh system could appear as soon as late 1997, with several new PowerBook and desktop models expected to ship with DVD drives by early 1998.

The idea of a DVD disc is simple—store enough data to hold a two-hour movie and play back data fast enough to support full-screen digital video. Although its name is ambiguous (first it stood for Digital Video Disc, then Digital Versatile Disc, and now nothing in particular), DVD essentially means high storage capacity, 7 to 25 times as much as a CD-ROM with the same disc size.

The exact capacity depends on how the DVD is prepared. A single-sided, single-layer disc holds 4.7GB; a single-sided, dual-layer disc holds 8.5GB; a double-sided, single-layer holds 9.4GB; and a double-sided dual layer holds 17GB. You have to turn over double-sided discs, at least on all the players available in the next year. But all DVD drives will read both single- and dual-layer discs.

Full-Screen Video A DVD transfers data at 1350 KBps—equivalent to a 9× CD-ROM drive—fast enough to deliver good-quality, full-screen (640-by-480-pixel) movies, and that's exactly what the consumer DVD players do—deliver movies to a TV set. A 4.7GB disc stores two hours of video with MPEG-2 compression, with much better quality than the older MPEG-1 compression, which was designed for the data-transfer rates of early CD-ROM drives. A second-generation 2× DVD drive, with a data-transfer rate fast enough for digital high-definition television, should be available in about two years.

Magic Decoder You can't simply plug a DVD drive into a computer as you would a CD-ROM drive. Video is always coded in MPEG-2 format, which must be decoded for viewing. A DVD drive has no MPEG decoding on board. Instead, MPEG-2 decoding is handled either on a hardware card or in software. This card also handles Dolby AC-3 surround-sound decoding with outputs for five different channels—left, center, right, and two surrounds—plus a subwoofer.

Hardware decompression will be available at first as a separate PCI card, but later

continues

Internet WATCH

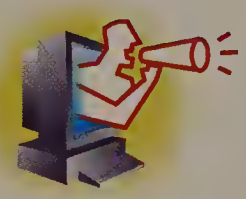
BY CAMERON CROTTY

Web Animation in a Flash

Looking to lock down the lead in Web-based animation, Macromedia (415/252-2000, *http://www.macromedia.com*) has acquired FutureWave Software. The acquisition includes FutureSplash Animator and FutureSplash Player, which have been renamed Macromedia Flash and Shockwave Flash Player, respectively. Flash uses vector graphics to create animations, resulting in dramatically smaller file sizes than the bitmapped animations created with Shockwave Director or GIF89ax. Macromedia Flash is currently available for Mac, Power Mac, and Windows 95 and NT for a street price of $249. The Shockwave Flash Player supports Netscape Navigator and Microsoft's Internet Explorer; download it free from Macromedia's Web site.

Web Data That Finds You

Recent Web developments mean that instead of your searching for information, the information you want comes looking for you. The latest incarnation of this trend is Intermind Communicator, from Intermind (206/812-8408, *http://www.intermind.com*). On the server side, Web administrators can send updates to users equipped with the Communicator client software. The client software prepares a Web page containing these updates—which include live links to the content provider's site—and stores that page on your hard drive. You can download the client software for free from Intermind's site, and the server software is free for nonprofit organizations, students, and personal use. Commercial and intranet publishers can license the server software on a per-connection basis.



Progressive Streams Video

The folks who brought you RealAudio are moving to video. Progressive Networks (206/674-2700, *http://www.realaudio.com*) has announced RealVideo, a streaming video technology based on the Real Time Streaming Protocol, which was proposed to the Internet Engineering Task Force last October. Progressive Networks says that quality will range from 10 frames per second over 28.8-Kbps connections to 30 fps over a LAN. RealVideo support is wrapped into the company's new RealPlayer client software; a beta is available for download from Progressive Networks' Web site. Site administrators can download a software encoder to place small clips on their Web pages, but for full-bore video, a separate server is needed.

Director 6: A Slick Face-lift Leaves a Few Wrinkles

BY JIM HEID

Just a year after releasing Director 5, Macromedia is about to ship a new version of the most popular multimedia authoring tool. After trying out a beta version of Director 6, I found enhancements that should appeal to Web developers and advanced users, but in spite of some simplified features, novices can still expect a challenge.

Streamlined Environment Director 6 still uses a timeline metaphor for authoring rather than the screen-oriented approach of programs like mFactory's mTropolis, in which you create productions as a series of interconnected screens. Still, Director 6 novices will appreciate the simplified Score window, which puts less emphasis on individual animation cels, instead stressing the sprites (media elements) that make up Director projects. Some key Score window enhancements: You can have up to 120 active sprites, compared with only 48 in Director 5. You can change an animated sprite's duration in the timeline, and Director 6's keyframes automatically adjust accordingly. And you can open multiple Score windows and set different zoom settings for each.

Director's Stage, where sprites appear, has new productivity boosters. Choose the new Sprite Overlay command to display information—name, cast number, properties, and animation path—about a selected sprite. Click on the icon next to a piece of information, and a settings dialog box opens. This feature and a new Sprite Inspector window let you fine-tune a project without returning to the Score window.

Behavior Modification Beginners and gurus alike will appreciate the new Behavior Inspector, which lets you assign actions to sprites without pecking out Lingo scripts. You can create multiple behaviors for a sprite and switch behaviors from one sprite to another.

Web authors will appreciate the inclusion of streaming Shockwave, since it downloads media elements as they're required, making larger Shockwave movies more practical. In addition to support for ActiveX objects, there's also complete Java integration: you can embed a Shockwave movie as a Java applet and play Java applets within Shockwave movies.

Despite Director 6's simplified Score window and new Behavior Inspector, the timeline metaphor gives it a steeper learning curve than you'll find in either Apple Media Tool or mTropolis.

But Director's unmatched array of performance-tuning options, screen-layout tools, and animation features still make it the best tool for developing animation-intensive productions. For novices, Director 6's streamlining will mean fewer tears in those first few days with the program—not a vast improvement, but enough to attract users overwhelmed by previous versions.

Director 6's Behavior Inspector provides pop-up menus for assigning actions to events, such as clicking on a sprite, while information is displayed on the Stage for the selected cast member.

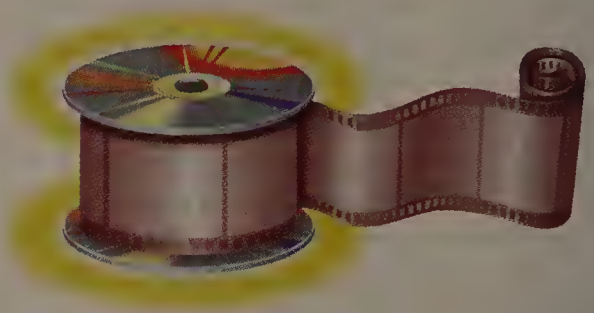
the decoding may be combined with video on a single PCI card. The decompression card also handles the copy-protection scheme for the discs. Some MPEG-2 cards will have a video-out connector that will allow a Mac to display directly on a TV set in addition to the monitor.

Less costly MPEG-2 software decoding should be available within a year, running either directly on a PowerPC CPU or, more likely, with assistance from a multimedia processor. However, only a high-powered computer—200MHz or faster—can do it; slower machines, including most of today's desktop Macs, must use hardware decoding. If you don't need full-motion video and movie audio, you can dispense with MPEG decompression altogether.

First-generation DVD drives and DVD players leave out a potentially useful feature—they will not be able to play DVD audio discs (that's pure audio, not movie soundtracks) because this new DVD audio format is still being debated. DVD drives and DVD players will play standard CD audio discs, though.

A High Premium What's all this going to cost you? You'll pay a premium to be on the cutting edge—about $600 to $800 for the DVD drive and hardware decoder, compared with about $100 for an internal CD-ROM drive. As with other peripherals, prices should drop quickly as the drives become commodity items.

Although DVD drives can read CD-ROM discs as well as CD-RW discs, they don't read CD-R discs—a significant disadvantage for the many companies that have standardized on CD-R as a distribution and backup medium. The reason is that DVD players use a shorter-wavelength laser than CD-ROM drives use that doesn't recognize changes in CD-R discs. One way to solve this problem is to design a premium DVD drive with a second laser that could read CD-R discs. Some companies are considering a CD-R2 disc that would work with both CD-ROM and DVD drives, but such a disc has turned out to be difficult to make.



Further Ahead Beyond DVD, several makers are working on an even higher-capacity optical drive with a blue laser, whose short wavelength makes even denser data storage possible; a single-sided, single-layer disc for a blue-laser drive could store as much as 15GB. But such discs would be incompatible with DVD drives, so we will need yet another round of drive upgrades, perhaps in eight years.

online

Meet the New HTML

VERSION 3.2 INCLUDES FAMILIAR TAGS, EXCLUDES SOME OTHERS

by Roxanne Gentile

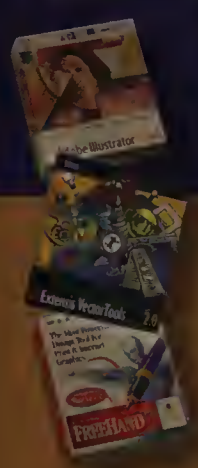
Bring on the data and 2 million screaming content providers: in January, HTML 3.2 became the second HTML Recommendation formalized by the World Wide Web Consortium's (W3C)

continues

JOHN BLECK

CUT THROUGH THE VECTOR JUNGLE WITH EXTENSIS VECTORTOOLS

ILLUSTRATION BY RON CHAN



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Circle 13 on reader service card

Extensis

Macworld MAGAZINE best show MACWORLD EXPO SAN FRANCISCO 1997

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Editorial Review Board.

The HTML 3.2 specification presents no surprises; content providers have been implementing many of its "new" elements (such as applets, tables, and font color and sizing) as extensions for at least a year. That's exactly the point, according to David Raggett of MIT, author of the HTML 3.2 specification. Elements written into the new spec have met the most essential criteria: they have been widely deployed and proved to be interoperable across various platforms.

A Rocky Road The W3C, an industry consortium that controls the HTML specification, has had a rocky march to HTML 3.2. In March 1995, the group drafted a feature-heavy HTML 3.0. But the complex, comprehensive specification expired without becoming a formal recommendation. Although some elements of the spec were finished, others weren't quite ready for prime time. So, opting for the methodical approach, the W3C recommended the HTML 2.0 specification, and followed up with HTML 3.2. Both 2.0 and 3.2 are pared down in relation to the ambitious 3.0 specification but enjoy the life-giving advantage of industry agreement.

Because they have already been implemented as extensions, the tags in HTML 3.2 are well understood and widely supported on the Web. Client-side image maps, outlined but undeveloped in the HTML 3.0 draft and not included in HTML 2.0, are familiar items on many Web sites. The Font element and its new attributes Color and Size provide a greater variety of text formatting, and Style and Script placeholders offer a glimmer of flexibility to come, when specific scripting and style sheets will be incorporated into HTML documents.

One element that didn't make it into the recent specification is the Object tag (see *http://www.w3.org/pub/WWW/TR/WD-object*). The HTML specification still doesn't offer an "official" tag for including various types of in-line media in Web documents.

However, Raggett says he expects the Object tag to fulfill this purpose and be written into a new HTML specification within the year. He expects the specification, code-named Cougar, to include frames, the Object tag, scripting, style sheets, the rich tables model, and extensions to forms, among other elements (see an experimental implementation of Cougar and recently recommended Cascading Style Sheets at the W3C Web site *http://www.w3.org*).

Bandwidth Issues Complex, high-bandwidth features like this are a concern for the W3C, since much of the group's charter is to ensure that HTML remains viable across multiple platforms and accessible to users on all computing levels.

Raggett says the Cougar spec will allow Webmasters and users to more easily serve and receive data in ways that are palatable to a wide range of surfers, from desktop machines down to PDAs.

The W3C, jointly run by the MIT Laboratory for Computer Science in the United States, the National Institute for Research in Computer Science and Control in France, and Keio University in Japan, includes representatives from IBM, Microsoft, Netscape Communications, Novell, SoftQuad, Spyglass, and Sun Microsystems.

WHAT'S NEW FOR HTML 3.2

What Made It	What Didn't (slated for Cougar)
Tables	Frames
Font size and color	Object tag for embedding multimedia
Tag for embedding Java applets	Style sheets
Text wrap around images	Scripting
Client-side image maps	Rich tables

multimedia

QuickTime Gets Video FX Architecture

UPGRADE ALSO BOOSTS WINDOWS SUPPORT

by Stephen Beale

Apple Computer (408/996-1010, *http://www.apple.com*) is ready to take the wraps off QuickTime 3.0, a forthcoming upgrade to its multimedia system software that will feature a new format for video effects and improved integration with Microsoft Windows. Apple plans a second-quarter 1997 release for QuickTime 3.0, which will be available for the first time as an authoring environment for Windows as well as Macintosh users.

The new video-effects format will allow software developers to create special effects that work with any digital-video–editing package that supports QuickTime, says Apple QuickTime program manager Ralph Rogers. The format will also allow for real-time image-processing operations previously available on Unix workstations, Rogers says. For example, during a preview at Macworld Expo in Tokyo, an Apple engineer caused water to ripple with the click of a mouse.

The new video effects architecture allows for alpha-channel compositing in moving images, similar to the still-image compositing functions in Photoshop. Using these capabilities, you could apply an effect—such as a fire effect—to a single sprite in a Director animation.

QuickTime 3.0 will also support vector animation and progressive downloading of QuickTime VR panoramas. You'll be able to run a Video for Windows (AVI) movie as if it were a QuickTime movie, with the option to convert the movie to QuickTime or keep it in the AVI format.

Windows Origins QuickTime 3.0 originated in Apple's announcement last September of QuickTime 2.5 for Windows. At the time, Rogers says, Apple wanted to offer a Windows version of QuickTime that was equivalent to QuickTime 2.5 for the Macintosh. Apple also went with a common source-code base for the Mac and Windows versions to facilitate faster cross-platform development. As QuickTime 2.5 for Windows evolved, Apple engineers added new features that went beyond what's available in the Mac version. Apple then decided to release a full upgrade for both platforms. From now on, Rogers says, versions of QuickTime for the Mac and Windows will be released within a few weeks of each other.

continues

JOHN BLECK

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Circle 65 on reader service card

Apple Drops GX Printing In a reminder that its graphics initiatives haven't all been as successful as QuickTime, Apple announced February 28 that it will drop the printing component of its QuickDraw GX imaging software.

The announcement was not a surprise; in August, Apple said it would unbundle the graphics and typography components of QuickDraw GX and make them available to GX software developers as a dynamically loading shared library (see "Apple Revives QuickDraw GX," "Mac OS 8: Back to Square One," November 1996). This meant you could run GX applications without installing GX itself. The printing component was the only portion of GX not included in the library.

QuickDraw GX, an optional extension to System 7, was slated to be the core imaging engine for Copland. But despite some impressive graphics and typography features, leading vendors such as Adobe, Fractal, and Macromedia balked at supporting GX, and only a handful of users installed it. A few small companies, such as Lari Software, PaceWorks, and SoftPress, developed GX-based graphics packages, but they found a limited following. These GX developers will now have to modify their packages to support printing through Apple's standard printer drivers; Apple says it is working with them to facilitate the transition.

In the meantime, Lari and PaceWorks are emphasizing the Web-authoring capabilities of their software. PaceWorks, for example, has introduced a vector-based animation compression technology called Vectorium that runs under a cross-platform extension to QuickTime. The extension, which lets you view the animations through any browser that supports QuickTime, can be downloaded from PaceWorks' Web site (*http://www.paceworks.com*). The animations are created in ObjectDancer, PaceWorks' GX-based animation software.

Apple plans to include the shared library in Mac OS 8 (formerly Tempo), the OS upgrade slated for release in July 1997, and still hopes to incorporate some of GX's graphics and typography features into Rhapsody, its next-generation operating system. But the company has not said which GX features it will incorporate or how those features will work with Display PostScript, which is slated to be the core imaging software in Rhapsody.

"NEW POWERPC CPU: A STEP AHEAD"

continued from page 31

The G3's smaller size—7.6mm by 8.8mm, with circuits just 0.25 microns (millionths of a meter) wide—is largely responsible for the lower power usage, since smaller chips emit less heat. Previous PowerPCs, as well as Pentium chips, use 0.35-micron circuitry.

The smaller size also means greater speed potential, since the smaller distance for electrons to travel means faster maximum calculation speeds. That's one reason why newer CPUs run at higher megahertz ratings than older CPUs.

The G3 includes a thermal assist unit—a kind of thermometer within the chip that lets system makers set a temperature threshold at which operations are to be interrupted or slowed, then resumed. By keeping both the power consumption and the temperature down, Mac makers can use the G3 in notebooks.

Other PowerPCs Although the G3 looks to be a popular chip for performance-oriented Mac desktops and notebooks, it's not going to replace today's PowerPC 604e's and 603e's completely.

For example, if you are running a multiprocessing system with more than two CPUs, you won't want the G3, since it was designed for multiprocessing with just two CPUs, Motorola says. (It's technically possible to use more than two G3's, but the Mac maker must add special control circuitry.)

Also, the 604e remains better at floating-point operations (commonly used in engineering, modeling, and some rendering work), since the G3 has been optimized for integer-based applications (which are used in most other types of work).

Thus, Motorola sees the G3 as a fast general-purpose chip, with the 604e being used for multiprocessing and scientific workstations.

The 603e will show up mainly in low-cost desktop and notebook systems, since it is the cheapest PowerPC to manufacture.

The 604e and 603e aren't standing still in performance, either; Motorola says these will hit speeds of 300MHz by the end of the year (see "The Mac Hits 300MHz," *News*, February 1997). Industry sources say the 300MHz 603e and 604e could ship by July. And sure to build on the strengths of the G3, the PowerPC G4 series is set to debut in early 1999.

KEVIN CANDLAND

Epson Does It Again?

Epson (310/782-0770, *http://www.epson.com*), whose Stylus Color 500 ink-jet printer received a 1996 Macworld World Class Award for best consumer printer, is preparing another market assault with the Stylus Color 800, a $449 color ink-jet that offers 1440-by-720-dpi resolution. The printer, which uses Epson's micropiezo ink-jet technology, offers output speeds of up to 7 pages per minute in color and 8 ppm in black and white. However, what sets it apart is its photo quality. One *Macworld* editor, looking at an Epson-supplied print sample, thought the company had entered the market for dye-sublimation printers. Options include Ethernet, LocalTalk, and an Adobe PostScript Level 2 driver.—STEPHEN BEALE

Best Consumer Digital Camera

(MacUser EddyAwards, Jan.'97)

Product of the Year

(InfoWorld, Jan.'97)

Stellar

(Windows Sources, Jan.'97)

★★★★

(Computer Life, Feb.'97)

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Plenty. How many pictures does the D-200L take?
Up to 80.

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Where?
On the color LCD screen. One at a time or nine at a time.

What's the resolution?
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Who says?
InfoWorld, for one: "The image quality far surpassed any of the other digital cameras." And *Windows Sources*: "It delivers the best images we've seen from a consumer-level camera."

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It's a razor sharp, wide angle, macro, Olympus glass lens.

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With red-eye reduction, fill flash and auto mode.

But does it feel like a camera?
With an optical viewfinder and Olympus design, it follows in the footsteps of the Stylus series, the most successful line of 35mm cameras in the world.

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And an art.

To learn more about the D-200L and how it completes the ideal home or office imaging system, contact your Olympus Marketing Representative at 1-800-622-6372. They'll also tell you all about the new Olympus personal storage system and CD writer.

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Circle 7 on reader service card

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score card MacWEEK ◆◆◆◆◆ MacUser RATED 5 5 5 5 5

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Circle 26 on reader service card

New Products

THE LATEST MACINTOSH RELEASES

GRAPHICS

Stock Images for All Seasons

Luckily for graphic artists, more stock imagery in every possible category is available now than ever before. Here are some of the latest offerings.

• PhotoSphere Images (604/876-3206, *http://www.photosphere.com*) has 25 new royalty-free photography CD-ROM titles for $250 each (online orders are $195 each). Collections include American History, World People, Energy & Technology, Occupations, Buildings & Structures, and American Landscapes.

• Visual Language has added two collections to its series of royalty-free antiquarian maps: Extraordinary Cartographic Motifs (Vol. IV) and Antique Maps of the Continents and Regions (Vol. V). Each contains more than 60 examples of maps and motifs from the sixteenth and seventeenth centuries. Each volume can be ordered from Image Club Graphics (403/262-8008, *http://www.imageclub.com*) for $170.

Visual Language Antique Maps

• PhotoVinci (608/784-4750) has four CD-ROM collections (Waterfalls, Mountain Lakes, Rivers & Streams, Southwest Landscapes) of high-resolution photographic images in CMYK mode for four-color printing and publishing. Each 25-image CD sells for $80; the 4-volume set costs $250.

• Westlight (310/820-7077) has released its Creative Freedom CD, which in addition to thousands of professional images includes two search browsers: Westlight's Questock 2.0 and Adobe Fetch. The CD and Westlight's Creative Freedom Catalog together are available for $40 (which is applied to your first order).

• A new stock-image publisher, Artville (608/243-1215), is licensing artwork from well-known artists and releasing a separate CD-ROM of each artist's work. Artville's first two releases will be Roundhead Executives by Barton Stabler and Money and Finance by Garrian Manning. Eventually, Artville expects to offer at least 200 CD-ROMs through its bimonthly catalog.

INPUT DEVICES

Getting Down to Business

Fujitsu (408/432-6333, *http://www.fcpa.com*) has introduced two new scanners to simplify life for the business professional. A high-resolution color desktop scanner, the $1995 ScanPartner 600C is optimized for full-color Web publishing with integrated software and the ability to handle documents of up to 50 pages. It provides single-pass 24-bit color, gray-scale, and bitonal scanning supported by the built-in 50-page automatic document feeder.

The $6495 M3093DE combines flatbed support with 45-images-per-minute duplex scanning capabilities and features enhanced image resolution and Fujitsu's Enhancement Technology (ET) for improved image quality.

Fancy Footwork

Repetitive strain injury sufferers, take note: now you can use a mouse and still save your wrists, with a unique input device that lets you mouse with your feet, not with your hands. The $260 NoHands Mouse from Hunter Digital (310/471-5852, *http://www.footmouse.com*) consists of two interchangeable floor pedals that allow users to perform all regular mousing functions with their feet. One pedal controls cursor speed and movement while the other handles clicking. The NoHands Mouse also serves as an adjunct to voice-operated systems.

Hunter Digital NoHands Mouse

MULTIMEDIA

MPEG Playback via Software

Video pros can now get a QuickTime addition that lets them play full-screen video on a Mac and view real-time video on the Internet—and it's downloadable from Macworld Online's Software Collection. Compatible with QuickTime 2.5, Apple's (408/996-1010, *http://quicktime.apple.com*) QuickTime MPEG extension permits software-only playback of full-screen MPEG-1 and VideoCD files on Power Macs. The extension also adds new capabilities for MPEG playback, including a resizable window. You can add other media types to MPEG files from the Clipboard and convert MPEG video to other QuickTime-compatible compression formats.

Extending Director

If you're a multimedia developer, you're most likely a Director user. Here are two new tools that extend the power of Macromedia's popular authoring package.

• Marionet for Director, from Allegiant Technologies (619/587-0500, *http://www.allegiant.com*), is a script-level interface to the Internet. It simplifies the creation of hybrid CD-ROM titles by giving multimedia developers access to Internet protocols—HTTP, NNTP, SMTP/POP3, FTP, DNS, and Gopher—from within their Director movies. Marionet is also used for building intranet applications that automate site management. Until June 30, the introductory price is $100; the estimated street price is $150.

• Stat Media's Buttons & Controls 3.0 is a Director Xtra that gives you drag-and-drop access to more than 2500 new buttons and controls as well as new keyboard shortcuts and lingo scripts (714/280-0038, *http://206.171.105.130/emall/stamed*). Version 3.0 sells for $180; upgrading from version 2.0 or 2.1 costs $50.

NETWORKING

No More Dedicated Servers

Tired of having to maintain a dedicated AppleTalk dial-up server for your employees to access their computers? Virtual Private AppleTalk from InterCon Systems (703/709-5500, *http://www.intercon.com*) allows AppleTalk access through standard TCP/IP protocols. A Personal Edition of MacVPA costs $99, and an unlimited site license is $8900.

Manage While You Browse

Targeted to the small-business and home-office markets, QuickStream Pro from Sonic Systems (408/736-1900, *http://www.sonicsys.com*) is a remote-access server you can configure and manage entirely from your Web browser. The $999 QuickStream Pro allows up to three users to dial in simultaneously and supports IPX, TCP/IP, and AppleTalk protocols.

ONLINE

Web Crawling at a Sprint

Searching for information on the Web can be a daunting experience. But help is in sight with Maxum Development's (630/830-1113, *http://www.maxum.com*) Phantom 2.0, a major upgrade to its Web-crawling software. Phantom enables Web-

continues

masters to build targeted search and retrieval capabilities into their Web sites. You can make an entire site searchable from a single entry point and can index remote sites. Phantom can now be administered via a Web browser, either on the same machine or remotely from anywhere on the Internet. Webmasters can customize searches, search results, and reporter pages, as well as automatically add banners. Retailing for $395, the upgrade is free to registered users.

Free Push Service

Digital Bindery (212/685-3727, *http://www.bindery.com*) has announced a free service of the same name that delivers customized Web content to any user with a Web browser and e-mail account, providing selected Web pages via e-mail anytime the content changes. Unlike other Internet "push" technologies, Digital Bindery requires no proprietary software or special arrangements with content providers. A special promotion allows any Web publisher who posts the Digital Bindery icon to receive $1 for every new user the publisher brings in.

Get Real

You can update data in real time on your Web site with WebCollage from Pensée (707/875-9452, *http://www.pensee.com*). The $249 package allows users to access data from databases, applications, or the Web and automatically build GIF files that get served to your site.

PRINTING

More Printer Options

GDT Softworks (604/473-3600, *http://www.gdt.com*) is doing its part to broaden Macintosh users' printer choices. Its $149 PostScript Level 2 interpreter, StyleScript 3.5, now provides better-quality color and LocalTalk support for Apple printers. PowerPrint 3.5 (due in April), a $49 printer driver that gives Macintosh users access to more than 1200 PC printers, will offer four times the speed of the previous version plus color enhancements; version 4.0, planned for August, will increase speed by about 20 percent and offer font downloading.

PUBLISHING

Taming Your Fonts

Adobe Systems (408/536-6000, *http://www.adobe.com*) has released Adobe Type Manager (ATM) Deluxe 4.0 and Adobe Type Reunion Deluxe 2.0, for both Macintosh and Power Macintosh. ATM Deluxe provides drag-and-drop management of Type 1 and TrueType fonts, allowing you to group fonts into sets, activate and deactivate sets and fonts, and substitute missing fonts. With Type Reunion, you can organize fonts within an application's font menu, set and view customized font names and menus, and display them in their actual faces. Introductory pricing (until early May) is $50 for ATM, $30 for Type Reunion, and $70 for both. After that, the prices will be $100, $60, and $150, respectively.

Streamlined GX Publishing

With the latest version of UniQorn, the QuickDraw GX–based page-layout package from SoftPress Systems (800/853-6454, *http://www.softpress.com*), you can take advantage of QuickDraw GX without the overhead. UniQorn 1.2 supports the GX Graphics extension, which provides the full graphic and typographic functionalities of QuickDraw GX separate from the GX print architecture. The $449 UniQorn 1.2 also lets you use Type 1 fonts without converting them to GX format, which simplifies its use in design and prepress environments.

STORAGE

CD-ROM Acceleration

Syncronys Softcorp (310/842-9203, *http://www.syncronys.com*) has begun shipping CD Speedster-Mac, a high-performance CD-ROM driver coupled with an integrated RAM and hard-drive caching engine that includes SuperCache CD-ROM acceleration technology originally developed for the Macintosh server platform. CD Speedster-Mac's dynamic hard-drive cache watches CD activity and, in the background, caches frequently accessed data for accelerated retrieval. Selling for an estimated street price of $30, CD Speedster-Mac supports any Mac running System 7.X with at least 4MB of RAM, and any CD-ROM drive; it requires 20MB of disk space.

Faster Tape Drives

MicroNet Technology (714/453-6000, *http://www.micronet.com*) has announced tape drives for network and other large-file backup applications using Sony Electronics' new AIT (Advanced Intelligent Tape) technology for the Mac. At $4995, the new drives fit in a 3.5-inch form factor and offer a 3-MBps transfer rate. The 25GB AIT cartridges (about $100 each) will contain a flash ROM chip (Memory In Cassette) that logs information about what's on the tape and where it can be located.

MicroNet Technology AIT drive

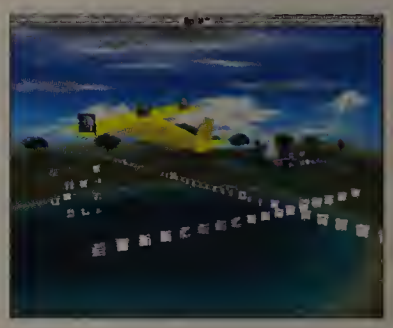
SYSTEMS

Speedy Upgrades

Thinking of upgrading? Newer Technology (316/943-0222, *http://www.newertech.com*) has released new upgrade options for Power Mac and PowerBook 1400 owners.

• The Maxpowr card includes a choice of 180MHz, 200MHz, or 225MHz 604e CPU to boost the 7500, 7600, 8500, and 9500 to new heights. The prices are $995, $1195, and $1395, respectively. Multiprocessor versions, using two of these CPUs, sell for $1645 and $1895.

• The Nupower 1400/200 boosts the speed of a PowerBook 1400 to 200MHz with a 603ev processor. The $750 upgrade also adds 128K of Level 2 cache.



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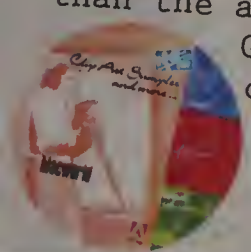

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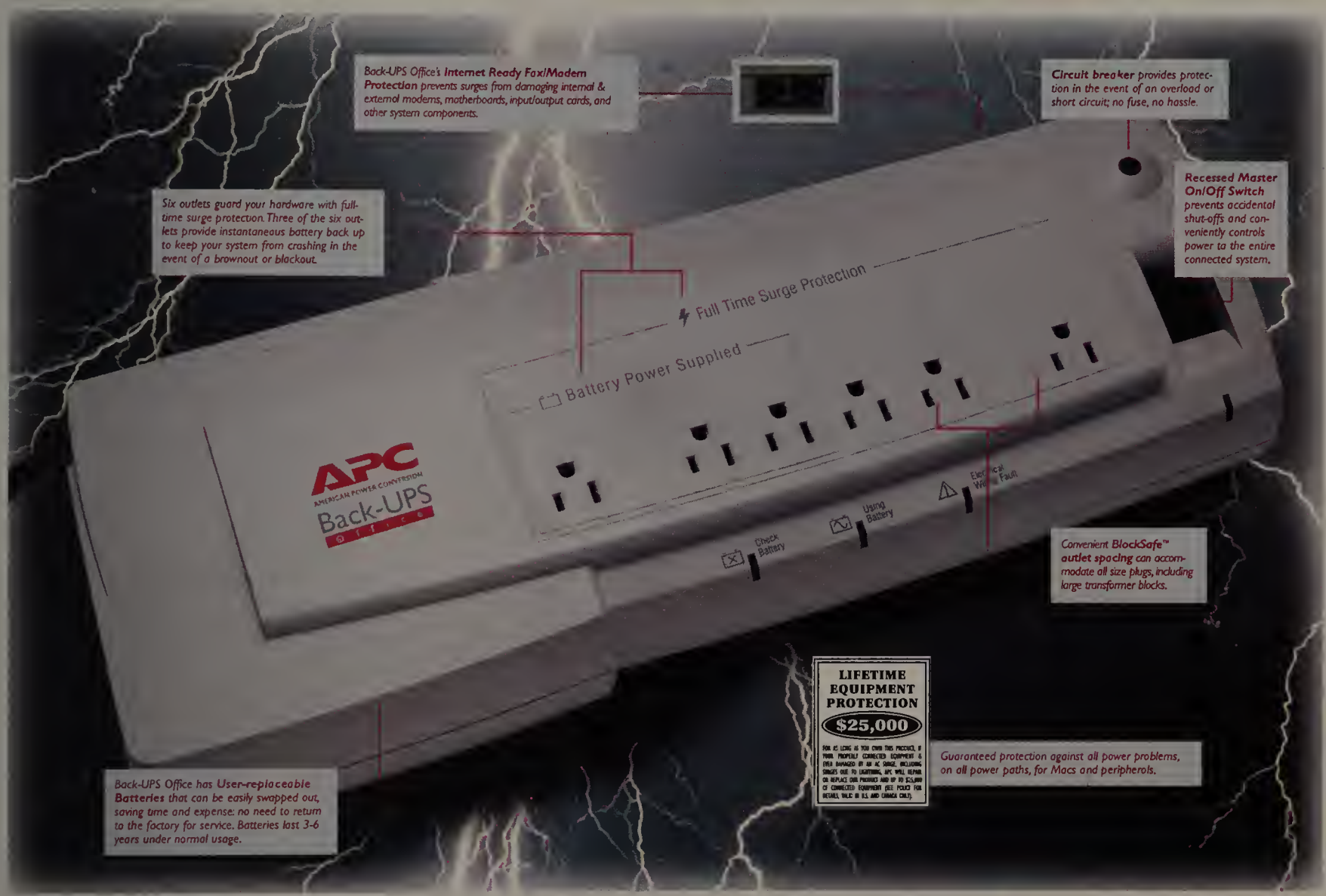

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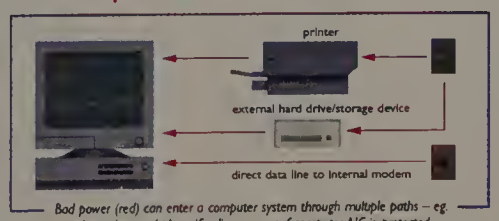
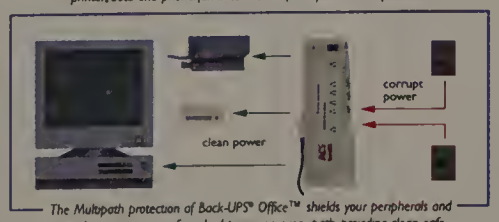
Multipath Means Total Power Protection



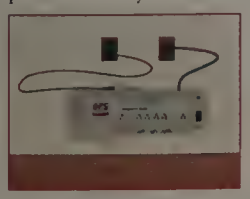
Bad power (red) can enter a computer system through multiple paths – eg. printer, data and phone/fax lines – even if computer A/C is protected.



The Multipath protection of Back-UPS® Office™ shields your peripherals and guards your computer from bad power on every path, providing clean, safe power (green), to your entire system.

Unique Multipath protection keeps your Mac and data safe

Plugging a phone line into your computer doubles your vulnerability to power problems; add any peripheral, and it triples. Even if your AC power-line is shielded, when a surge hits an unprotected peripheral, it can blaze down serial and data lines, and toast your expensive Mac.



Back-UPS Office's compact design installs easily on desktop, floor or mounts to wall.

Multiple peripherals and data lines to and from your system are vital, but dangerous. Without them, you can't do your job. However, if a power sag makes your modem drop the line while you're downloading from the Internet, or locks your keyboard before you've saved work, you lose time, money and spend another late night at the office to meet your deadline.

Back-UPS Office protects your entire system

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Back-UPS Office means true Multipath protection, clean, safe power to every peripheral, and instant battery backup to keep your cutting edge system and O/S from crashing. It means protection for less by integrating the security of a surge suppressor with the power of a UPS, guaranteed up to $25,000.

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Spikes	•	•	•
Blackouts		•	•
Brownouts		•	•
Overvoltages			•
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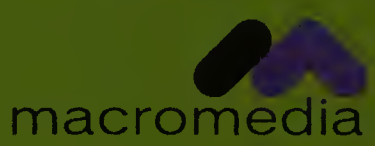

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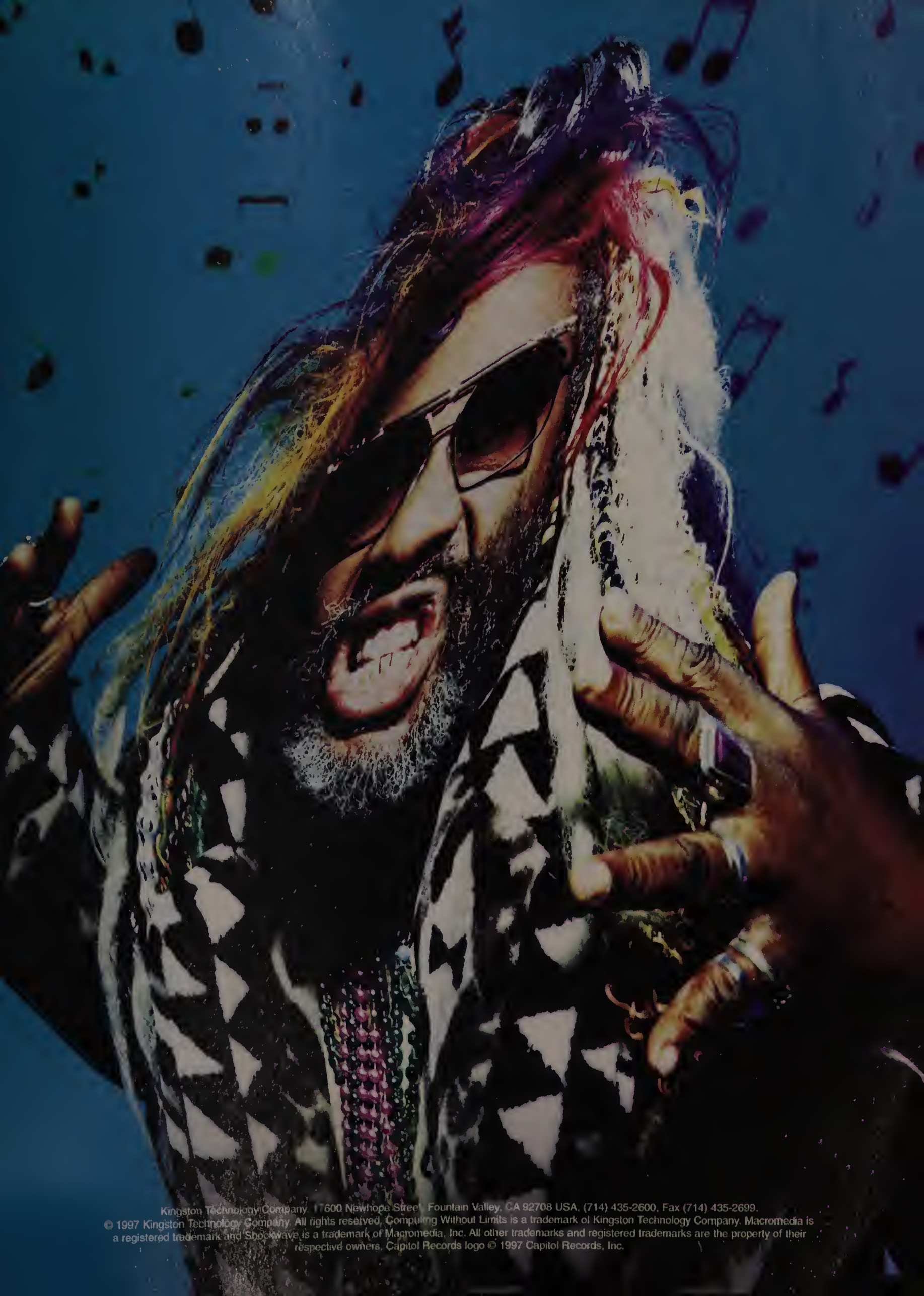

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Reviews

PageMaker 6.5

WEALTH OF NEW FEATURES, UNEVEN IMPLEMENTATION

JEFFREY PELO

THE MORE I WORK WITH ADOBE PageMaker 6.5, the more I'm reminded of the tortoise and the hare. QuarkXPress zoomed to prominence in the early 1990s and then took a break from the desktop publishing race—the last major revision was released in 1993—while PageMaker has been revised three times in the same period. Yet despite steady progress, it appears that the plodding PageMaker may set the children's parable on its ear by losing the race to the leaps-and-bounds approach of QuarkXPress.

That's surprising, because the beta version of PageMaker 6.5 added a slew of exciting features: document layers à la Photoshop, frames to hold text and graphics, and enough HTML-export capabilities to make the program a real player in the Web-publishing market. Subtler improvements included a new interface and a revamped plug-in architecture that made the product easier to use. Unfortunately, the final version implements many of these features so awkwardly that PageMaker stands little chance of regaining the momentum it lost to QuarkXPress half a decade ago.

Bright Spots

Among PageMaker 6.5's winning enhancements is the new layers feature, which lets you assign objects to what is in effect an electronic transparency. You can put annotations on a layer and display or hide them at will; create multilingual documents, with each language on its own layer; or put art on its own layer and then hide it for fast scrolling or printing. Like all the major palettes in PageMaker 6.5, the Layers palette is well designed and easy to work with.

PageMaker's new interface is a big improvement over the last version's, yet it still feels familiar. The Photoshop-style tabbed panes are a boon, letting you organize functions the way you want them and keep on-screen clutter to a minimum. The keyboard shortcuts are mostly for the better, and the wonderful Printer Styles feature introduced in version 6.0 is now easily accessible, thanks to its new location in the File menu. And PageMaker can now automatically move and resize objects if the page size changes.

Perhaps the best ease-of-use improvement is the quick-access drop-down menu in the palettes. Click on the triangle icon, and you get a list of functions appropriate to that palette—for example, the ability to define, delete, edit, and apply colors or convert spot to process colors in the Colors palette. I wish the Mac version let you use the option, control, or ⌘ key to get a menu of options for any object, as its Windows 95 counterpart does with the right mouse button.

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Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

Features Left Half-Baked

Unfortunately, many of PageMaker 6.0's weaknesses (see *Reviews*, November 1995) endure in version 6.5: the drop-cap feature is an unwieldy abomination, the page-sorting function is better-looking but still slow, and using the automatic bullets and numbering is more work than typing them in by hand. The spelling dictionary and table editor should be integrated into the main program, and the table editor needs to create a table that you can edit and apply text styles to rather than a static, graphical version of a table.

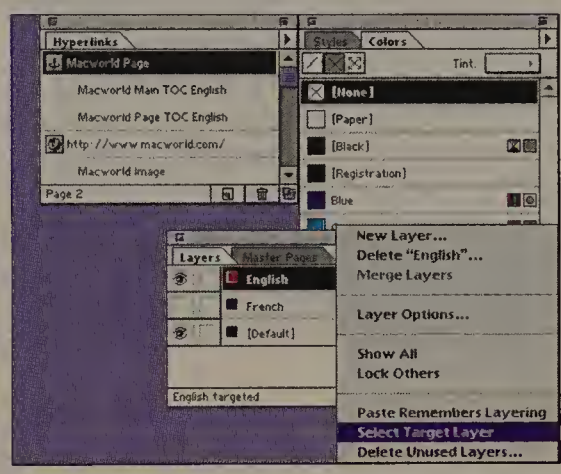
Many new features are half-baked as well. For example, PageMaker now lets you create boxes, or frames, in which you can later place text or graphics. That's a real improvement over PageMaker's original placement method, which insisted that you place dummy text or images and replace them with the real thing later to create a layout template. The program even one-ups QuarkXPress by letting you place either text or graphics in a frame. But then PageMaker blows it by limiting frames to a single column; to make them multicolumn you have to draw a frame for each column and then link them. If you add or delete a column, you have to resize the remaining columns accordingly (in XPress, you simply click on a frame and change the number of columns in a palette; the text reflows automatically).

Web Weaknesses

Although Adobe has cleaned up PageMaker's interface and made some print enhancements, the main focus of version 6.5 is Web support. You can create hypertext links to other locations in your layout and to Web pages, map paragraph styles to HTML styles, and convert your images into GIFs or JPEGs. Sounds like a great combination: WYSIWYG layout capabilities and core HTML support.

But although Adobe is marketing PageMaker 6.5 as a Web tool, serious flaws in the implementation greatly limit PageMaker's usefulness for online publishing. For example, with the single exception of horizontal lines, graphics you create in PageMaker aren't exported to HTML or converted into GIFs or JPEGs—only imported graphics are.

Because of a design flaw in the HTML export dialog box, PageMaker usually merges multipage documents into one colossal Web page rather than separate, more easily navigable pages. If that happens, you'll probably go back and export your document a page at a time—only to find that the program has removed links to content on the other pages (links to URLs are retained, as are links to content on the page being exported). You then need a Web authoring tool to replace the links in those individually exported pages. There *is* a way to export multiple pages and retain the links among them, but it's not at all obvious and is not documented. In addition, PageMaker doesn't properly code one of the HTML styles it supports (Definition List), and it can't export tab-based tables to HTML (tables created with the Adobe Table utility are converted into graphics).



Palette Pleasers Among PageMaker's improvements are an enhanced interface—particularly its new palette design—and a layers function.

In contrast to these flawed implementations are the well-designed Hyperlinks palette, which makes creating links a snap, and an Export HTML dialog box that lets you add background images, map PageMaker styles to HTML styles, create separate export styles, preserve approximate layout, and downsample exported images to 72 dpi.

PageMaker also does well with its library of Web-safe colors, its selection of Web-page sizes, and a new grabber tool that lets you click on a hypertext link within PageMaker and jump to the appropriate page in your layout or on the Web.

But these thoughtful approaches need to be incorporated throughout PageMaker, not just in a seemingly random set of features. The bottom line is that since you'll need a Web authoring program anyway, you'll probably only use PageMaker to convert existing documents to HTML format for further work in another program. It's a shame PageMaker can't export HTML pages as well as it lets you create them.

In addition to fixing PageMaker's print and online flaws, Adobe needs to work on bridging the gaps between its program and QuarkXPress (and the Windows-only Corel Ventura, for that matter). Not only does Adobe need to upgrade PageMaker's layout tools to match XPress's in flexibility, precision, and automation, it needs to add the extras that will lure the professionals Adobe is hoping will adopt PageMaker. It would be a no-brainer to add character styles, for example. And how about automatic text wrap around an image? Or an easy way to change text flow between frames? Or a layer on which users with pen-based tablets could write their annotations rather than typing them? Or support for hidden and revised text so you can track changes in your layout?

The Last Word

Adobe needs to commit to making PageMaker a leader again. The PageMaker design team clearly has lots of good ideas and has been adding them incrementally over the years. But for every good idea PageMaker implements well, it implements at least one other awkwardly. The result is that, despite undergoing three revisions while QuarkXPress had none, PageMaker hasn't even caught up with—much less surpassed—XPress.

I hope PageMaker 7.0, due sometime next year, finally catapults this publishing pioneer to a truly new level. In the meantime, if you do professional print work you'll probably find that the ease-of-use benefits alone are worth the $99 upgrade cost. But casual users should save their money, and online publishers should stick with tools designed specifically for creating HTML.

How many more times can Adobe take this one-step-forward, one-step-back approach with PageMaker? The tortoise only wins the race if it diligently keeps to its course. PageMaker has been wandering.—GALEN GRUMAN

RATING: ★★★/6.8 **PROS:** New layers feature; significantly enhanced interface. **CONS:** Uneven Web authoring capabilities; retains awkward features from previous versions. **COMPANY:** Adobe Systems (408/536-6000, *http://www.adobe.com*). **COMPANY'S ESTIMATED PRICE:** $895.

PowerBook 3400c/200

THIS LUXURY LAPTOP'S WORTH THE WEIGHT

THE FASTEST LAPTOP EVER MADE—has a nice ring, doesn't it? With the biggest screen ever, the fastest modem yet, booming four-speaker sound, a speedy CD-ROM and even exhaust grilles, the PowerBook 3400c/200 is the Lexus of luxury laptops.

Nearly every component is speedy: the 3400's 33.6-Kbps modem, 16MB of ultrafast EDO RAM (expandable to 144MB), internal PCI bus circuitry, video electronics, and PC-standard IrDA infrared transceiver are all faster than the corresponding components on the 1400 (see "PowerBook with a Punch," April 1997, for details). Even the air inside moves faster: an internal fan occasionally clicks on, cooling the 3400 through tiny vents on the laptop's leading edge.

Center all these features around a 200MHz 603e processor, and you have a laptop that's not only faster than the 604-based Power Mac 8500/132, but whips past any Pentium laptop you can buy. (Apple also plans to offer 180MHz and 240MHz versions later in the spring, but they weren't shipping in time for review.)

You could buy two PowerBook 1400c's for the price of one 3400c—the new models cost between $4500 and $6500 depending on speed and features—but the 3400 is about twice as fast and offers some enviable extras. Its bright, 800-by-600-pixel screen is nearly an inch larger diagonally than the 1400's, and its combination Ethernet/fax-modem jack is far superior to those dangling appendages on PC Card modems; it accommodates whichever cable you insert (10BaseT or telephone).

There's a new lithium-ion battery, too, but in my tests it lasted just slightly longer than the 1400's batteries, most likely because of the 3400's greater juice demands. Finally, you get four speakers:

SUZANNE ROADY

two above the keyboard, plus a pseudo-subwoofer pair at the edges of the bulging, resonant lid.

The 3400's video features are in the style of PC laptops', including a VGA monitor jack—good for travelers, especially. Unfortunately, now you need an (included) adapter to connect a Mac monitor, and any external screen can only mirror the desktop, not extend it—a change from recent PowerBooks.

The 3400 sports two PC Card slots, and you can swap the floppy drive for a CD-ROM drive (or 5300-series gadgets, such as a hard drive or the still-not-quite-shipping Zip drive from VST Technologies), without even putting the PowerBook to sleep. Don't try *that* on a Windows laptop.

Inexplicably, the PowerBook 3400 lacks some of the finer design touches that give the 1400 its sleek, rock-solid feeling. The 1400 has a flip-open keyboard for easy upgrading, a back-panel door that retracts instead of breaking off, a clear top panel (for photos, your itinerary, or even a solar panel), a crisp keyboard, and a magnetic lid-closing sensor. The 3400 lacks these innovations, and its corresponding 5300-style components are mushier and more cumbersome. When you factor in its added 3/8 inch of height and 5 ounces of weight, the 3400 looks like a hulking brute, not a lithe sprinter.

The Last Word

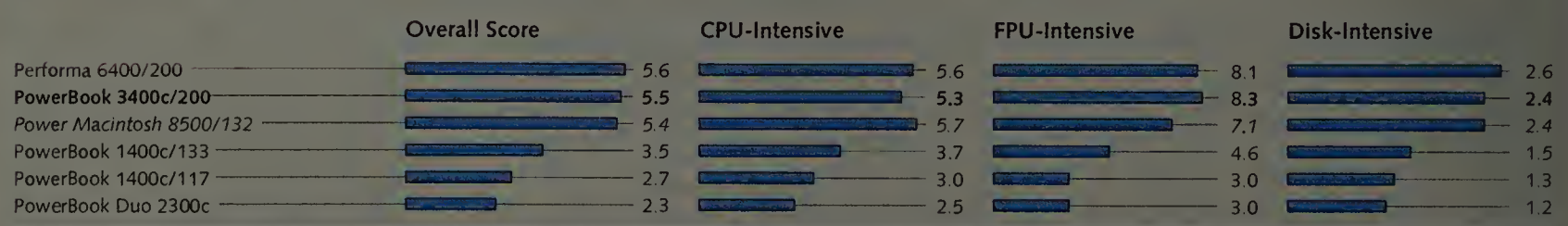
Otherwise, though, the PowerBook 3400c is the most successful laptop Apple has ever built. With this much speed, Web browsing, Photoshopping, QuickTime moviemaking, and, yes, even running Microsoft Office are possible. For the first time, the Mac pro can stop thinking of the PowerBook as a make-do satellite computer; the PowerBook 3400c can be *the* computer.—DAVID POGUE

RATING: ★★★★/7.6 **PROS:** Thrilling speed; bright 12.1-inch screen; clever built-in Ethernet/modem jack. **CONS:** Heavy; lacks PowerBook 1400 design improvements. **COMPANY:** Apple Computer (408/996-1010, *http://www.powerbook.apple.com*). **LIST PRICE:** $5500 as tested (200MHz, 16MB of RAM, 2GB hard drive, 6× CD-ROM drive).

Macworld LAB TEST

PowerBook 3400c/200: As Fast as a Desktop System

Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed from fastest to slowest overall. Discontinued Macs are in italics and presented for comparison.



Behind Our Tests

For details on how we tested, see "PowerBook with a Punch," April 1997.—Macworld Lab testing supervised by Mark Hurlow

SyJet

A BETTER WAY TO STORE YOUR STUFF

THE AGGRESSIVE MARKETING and timely introduction of Iomega's Zip and Jaz drives have left SyQuest Technology scrambling to keep up in a field it once dominated. SyQuest's answers to the Zip, the EZ135 and EZFlyer 230, can be politely described as modest successes, and delivery of its would-be Jaz killer, the 1.5GB SyJet (formally announced way back in January 1996), has been repeatedly postponed. Luckily for SyQuest's future, the oft-delayed SyJet proves a worthy contender in the removable-drive derby.

Performance, and All That Jaz

In Macworld Lab trials, the SyJet bested the Jaz drive by margins of 10 to 20 percent in four out of six key tests (see "SyJet: Faster Than Jaz for Most Tasks"). The SyJet fell behind the Jaz in two other trials, though—most notably in the drive-access– and seek-intensive database test, where the SyJet took more than 25 percent longer to perform a search. The SyJet also was noticeably slower than our baseline 2GB hard drive in all tests, despite SyQuest's claims of true hard drive speeds.

As an informal test of its video-capture performance, I hooked up the SyJet to a Power Computing PowerWave 604/150 with a Miro DC-20 video board installed. At full resolution (640 by 480) and at a capture rate of 2.5MB per second, the SyJet was able to capture video at 30 frames per second with only a handful of dropped frames—quite respectable for a removable-media drive.

Glitches and Peculiarities

Alas, the SyJet experience isn't trouble-free. A small printed insert warns of potential problems when your Mac's SCSI chain exceeds 9 feet, and after including the SyJet on a 12-foot-long SCSI chain (still well within the SCSI spec) I did indeed have some difficulties. My Hewlett-Packard 4c scanner refused to complete its start-up self-diagnostic unless I powered it on before the SyJet.

SUZANNE ROADY

Another foible: you must push SyJet cartridges carefully into the drive's front slot, or frequently they won't mount. The SyJet also exhibits some strange design logic: the power cord between the drive and the AC adapter is too short to reach the floor from typical desk height. Rather than leaving the adapter perched in midair (which tended to make the drive slide around), I ended up having to leave the adapter cluttering up my desk.

EZFlyer Look-Alike

The SyJet is a near-twin to SyQuest's EZFlyer 230 (see *Reviews*, October 1996). Its sleek case weighs about 1.5 pounds, and a protective front cover seals the cartridge from dust. Two SCSI-2 jacks are located on the back panel, along with a SCSI ID selector—thankfully, SyQuest has abandoned the convoluted ID-changing scheme used on the EZFlyer. When you eject a cartridge, a tone (which you can disable) reminds you to remove it.

The drive's construction seems robust; there are no strange rattles when you shake the drive or the media. I accidentally dropped a SyJet cartridge a couple of feet onto a hard table, and it emerged unscathed. The SyJet is also relatively quiet while operating, purring gently when accessing and retrieving data.

The friendly manual helps you get set up in minutes. La Cie's Silverlining Lite software provides formatting and mounting capabilities, and a bundled utility lets you enable AV mode—for faster audio and video playback—and write verification.

The Last Word

They say that a near-death experience can invigorate a person to change his or her life for the better, and in this case it seems to hold true for companies, too. With faster performance and 50 percent greater capacity than Iomega's Zip drive—and an identical price—the SyJet seems poised to revitalize SyQuest's flagging fortunes. This drive has all the right ingredients to make it in the marketplace. Except, perhaps, timing.—GENE STEINBERG

RATING: ★★★★/7.6 **PROS:** Faster than Jaz; huge capacity; easy setup. **CONS:** SCSI chain sensitivities. **COMPANY:** SyQuest Technology (510/226-4000, *http://www.syquest.com*). **LIST PRICE:** External version $499; internal version $399; single cartridge $124.95.

Macworld LAB TEST

SyJet: Faster Than Jaz for Most Tasks

Best result in test. Times are in seconds. Shorter bars are better.

	Copy File to Drive*	Copy File from Drive*	Duplicate File*	Open Photoshop File	Save Photoshop File	Search Database
SyQuest SyJet	27.2	23.7	37.6	53.1	48.2	73.7
Iomega Jaz	31.4	21.4	41.4	62.8	57.7	58.6
*Reference hard drive***	*18.7*	*17.8*	*20.8*	*50.6*	*35.4*	*69.2*

** Using the Finder. ** 2GB Quantum Fireball TM21.*

Behind Our Tests Drives were connected to the external SCSI bus of a Power Macintosh 7500/100 with 32MB of RAM running System 7.5.5. Database tests used Claris FileMaker Pro 3.0.3; Photoshop tests used Adobe Photoshop 4.0. Finder and Photoshop tests used a 40MB file. Data verification was disabled on all drives for optimal performance.—**Macworld Lab testing supervised by Matt Clark**

Speed Doubler 2

UPGRADE IMPROVES NET TRANSFER TIMES

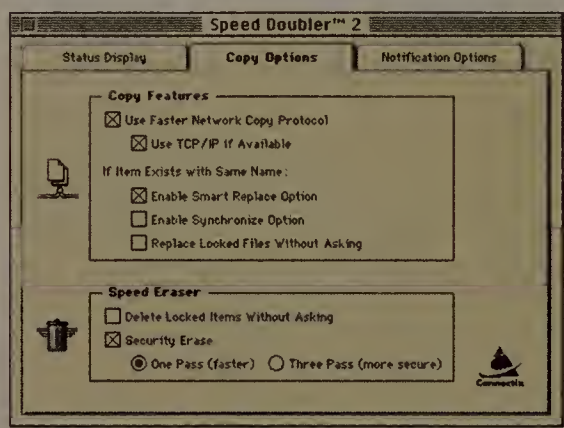
ALTHOUGH THE PROGRAM'S centerpiece—speedy 680X0 emulation for Power Macs—hasn't changed, Connectix Speed Doubler 2.0.1 offers new features that make it a worthwhile upgrade. The new version sports an improved interface and some minor application-performance and disk-caching tweaks, but the big news is its dramatic increase in network file-transfer speeds.

Because much of the Mac OS still runs in 680X0 emulation, Speed Doubler 2 will give your unaccelerated Power Mac a small performance improvement even if you're running all native applications. Like previous versions, Speed Doubler 2 clocked an approximate 9 percent improvement in overall performance in Macworld Lab's application benchmark test suite as compared with an unaccelerated Power Mac, and times nearly identical to those of Speed Doubler 1.3.1 across the board.

Speed Doubler's disk access, though, has been beefed up noticeably from previous versions. Disk-intensive tests show that Speed Doubler's caching scheme has been slightly improved over the previous version. Connectix says the program has also been optimized for better performance with small hard drives and removable devices.

File-transfer speeds across networks have improved noticeably (see "Network Performance Gets Biggest Boost"), although you have to install Speed Doubler on both client and server Macs to see a dramatic change—something the all-too-brief manual mentions only in passing.

Speed Doubler 2's file-copy feature is less successful. Like most programs that boost Finder copying speeds, Speed Doubler processes files in larger chunks and uses extra RAM to buffer information. Apple has tweaked the Finder in recent versions for faster copying as well, and I found that Speed Doubler didn't offer any measurable advantage when performing a single-file copy.



New Features, New Face Speed Doubler 2's new integrated control panel gives you access to options like file deletion and faster network file transfers from within a single tabbed interface.

As with previous versions, Speed Doubler 2 allows you to perform up to three simultaneous copies, a feature the Mac OS still lacks. Speed Doubler 2 also includes Smart Replace, a feature that allows you to copy only files that have changed since your last backup or transfer.

I wasn't impressed with the program's Secure Erase feature, which is supposed to shred files beyond recovery. Regardless of whether I used the single-pass or triple-pass erasing mode, I was able to recover at least a portion of the files using Symantec's Norton Utilities. Connectix has confirmed an incompatibility with Norton Utilities' Unerase module and is working on a solution for a future release.

As with other Connectix software, the program comes with a fast installer that gets you up and running in minutes. Where the previous version relied on three separate extensions to accomplish its duties, Speed Doubler 2 rolls all its functionality into a single extension, and configuration is done via a control panel (see "New Features, New Face").

The Last Word

If you aren't already using Speed Doubler, you should be. Current users, though, may not be as impressed as they were the first time around, especially now that nearly all mainstream applications are Power Mac native and realize little improvement as a result. Speed Doubler 2.0.1 offers application performance nearly identical to that of previous versions, although if you copy files over a network, it's worth the upgrade price.—GENE STEINBERG

RATING: ★★★★/7.2 **PROS:** Dramatic increase in network file-transfer speeds when used on both client and server Macs; multiple simultaneous Finder copies; faster application performance compared with unaccelerated Power Macs; easy installation and setup. **CONS:** No speed improvement over previous versions for basic application tasks; copy option shows little benefit on a single computer; file shredding only partly successful; so-so manual. **COMPANY:** Connectix (415/571-5100, *http://www.connectix.com*). **LIST PRICE:** $99.

Macworld LAB TEST

Network Performance Gets Biggest Boost

Shorter bars are better. Times are in seconds.

	Unaccelerated Power Mac 7500/100	With Speed Doubler 1.3.1 on Client	With Speed Doubler 1.3.1 on Client and Server	With Speed Doubler 2.0.1 on Client	With Speed Doubler 2.0.1 on Client and Server
Single-file network transfer	52.5	53.6	53.2	52.2	29.8
Dual-file network transfer	*	86.4	85.1	83.9	51.6

*Cannot perform dual simultaneous file transfers.

Behind Our Tests All systems were tested using System 7.5.5. Files were transferred from a networked Power Mac 8500/150 file server. Single-file tests used a 15MB file; dual-file tests added a 7.9MB file 5 seconds later.—**Macworld Lab testing supervised by Chris Uiterwijk**

Power Mac 9600/200

EASY EXPANSION COMES TO APPLE'S FAST TOWER

EVEN AT A GLANCE, IT'S OBVIOUS that the Power Mac 9600/200 is more than just a faster version of the 9500. Its new case, with its sidecarlike appendage, signifies that this is a whole new Mac. But the case is more than just a new aesthetic; it's also the biggest benefit of the 9600 family, making it easy—at last—to upgrade Apple's most upgradable system.

It's been a sad irony that Apple's top tower—with 6 PCI slots, 12 RAM sockets, a replaceable CPU card, and 2 free drive bays—has had a case so poorly designed that you'd never want to upgrade it. Finally, that's changed. The new design lets you easily flip down the case's left side and swing the power supply out of the way for easy access to all the slots. Apple pioneered a similar approach in the Power Mac 7500 and so far is the only Mac maker to offer such ease of expansion.

There are a few drawbacks to the 9600's design. One is that the soldered-on 512K cache—anemic for a 200MHz 604e system—isn't upgradable, a weird design flaw for an upgrade-oriented tower. And the 9600's free drive bays are limited to two, compared with seven in a Power Computing PowerTower Pro and four in a Umax Computer SuperMac S900. Across its line, Apple skimps on free drive bays; on the expansion-oriented 9600, that skimpiness is particularly galling.

Of course, ease of expansion isn't the 9600/200's only benefit—it also offers improved performance. The new tower is 14 percent faster than the fastest Power Mac 9500, despite the fact that both are based on 200MHz processors. That speed

ARNOLD TIOSEJO

increase comes from a faster hard drive and fast PCI video circuitry, including the IMS TwinTurbo 128 card with 8MB of VRAM, rather than the slower ATI Technologies card used in the 9500.

The Power Mac 9600/200 ranks alongside top-speed systems, performing up to 5 percent faster than competing same-speed Macs from Power Computing and Umax, and a significant 13 percent better than Motorola Computer Group's 200MHz 604e tower. In fact, the 9600/200 is the fastest 200MHz 604e system from any vendor, including Apple's own soon-to-be-shipping 7300/200 and 8600/200. (Although the latter two models were announced at the same time as the 9600/200, Apple doesn't expect to have them available until mid-March.)

Apple has priced the 9600 more realistically, too: it costs $400 *less* than the 9500. The 9600 still costs more than any competing system, but the gap has narrowed: it's now just $400 more than the SuperMac S900/200 and $1000 more than the PowerTower Pro 200. For the extra money, you get the easy-to-upgrade case, a 5 percent speed advantage, sturdier back-panel connectors, and the Apple name and reputation.

The Last Word

The Power Mac 9600/200 is a top-speed system, one that puts Apple neck and neck with competing Power Computing and Umax systems. It outperforms competitors and is easier to upgrade, but doesn't offer quite as much expansion capability—it won't be the system of choice for digital-video and multimedia creators, who need more drive bays. For color publishers and others who need top performance, though, the 9600/200 is a solid choice.—GALEN GRUMAN

RATING: ★★★★/8.1 **PROS:** Fastest 200MHz Mac; design facilitates easy upgrades; fast video card with 8MB of VRAM. **CONS:** Non-upgradable cache; costs more than competitors; limited drive bays. **COMPANY:** Apple Computer (408/996-1010, *http://www.apple.com*). **COMPANY'S ESTIMATED PRICE:** $3799.

Macworld LAB TEST

The Fastest 200MHz Mac from Any Vendor

Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed from fastest to slowest overall. Discontinued Mac (in italics) is presented for comparison.

	Overall Score	CPU-Intensive	FPU-Intensive	Disk-Intensive
Power Computing PowerTower Pro 225	9.2	9.4	13.4	3.5
Power Macintosh 9600/200	8.7	8.9	12.1	3.5
Power Computing PowerTower Pro 200	8.5	8.4	12.7	3.5
Umax SuperMac S900/200	8.3	8.5	12.0	3.0
Power Macintosh 7300/200 (prototype)	7.8	7.8	12.0	2.4
Power Macintosh 8600/200 (prototype)	7.7	7.8	11.6	2.4
Motorola StarMax 4000 MT604e-200	7.7	7.9	11.4	2.5
Power Macintosh 9500/200	*7.7*	*7.5*	*12.1*	2.9

Behind Our Tests For detailed information on how we tested, see *Mac Superguide*, January 1997.—Macworld Lab testing supervised by Mark Hurlow

200MHz Apple Servers

WORKGROUP, NETWORK SERVERS ARE TOWERS OF POWER

APPLE'S TWO TOP-END SERVers—the Workgroup Server 8550/200 and Network Server 700/200—are based on 200MHz 604e chips but diverge rapidly in capability and cost. Each is a good fit for a particular Web- and file-serving niche: midsize LAN or Internet connections for the 8550, and massive-enterprise–capable serving for the 700.

The Mac OS–based Workgroup Server 8550/200 sports a hefty 66 percent processor speed bump from its predecessor, the Workgroup Server 8550/132. RAM now starts at 32MB, up from 16MB, and is expandable to 512MB. An 8× CD-ROM and optional DAT drive round out the hardware enhancements. The 8550/200 runs System 7.5.3 and is bundled with your choice of AppleShare or the Apple Internet Server Solution (AISS). Open Transport 1.1.2 provides a huge performance boost in Web-serving applications.

The Network Server 700/200 runs IBM's AIX version of Unix rather than the Mac OS—essential in this machine's market, where it competes with other Unix-based servers. Like its predecessor, the Network Server 700/150 (see *Reviews*, September 1996), the 700/200 combines networking horsepower and high-speed I/O with Macintosh ease of use. A double-wide, lockable, rollable cabinet holds six front-mounted hot-swappable drives, six PCI cards, optional hot-swappable dual power supplies, and up to 512MB of RAM and 256GB of storage.

New with this model is support for 9GB Ultra SCSI drives; differential SCSI attachment through a third-party PCI card; and a new I/O subsystem for FDDI, ATM, and Token Ring networking. An 8× CD-ROM and DAT drive are optional. Significant improvements in the AIX TCP/IP stack boost network performance by up to 25 percent. As an added bonus, the 700/200 is upgradable to Apple's forthcoming Symmetric Multiprocessor (SMP) configuration.

Unix versus Mac OS

If you're looking for a Mac-like solution, the Workgroup Server is the machine for you. It sets up as easily as any consumer Mac, although you must install AppleShare or AISS yourself. Both are extremely simple, and the AISS installer takes you from bare-bones start-up to operational Web server in less than 20 minutes—a feat unmatched on other platforms.

The Network Server comes with blank hard disks; you install and configure the base AIX software from a CD-ROM. As long as you read the documentation carefully, setup (which takes about an hour, compared with days for competing servers) is straightforward, although you'll have to tangle with un-Mac-like Unix X Window sessions. Unfortunately, the Network Server as shipped can't actually serve anything; you need to buy additional software to accomplish AppleShare or Web serving. Five CDs of trial software accompany the package, but a good Web server is conspicuously absent.

KEVIN CANDLAND

Network Server 700/200 (left), and Workgroup Server 8550/200

Performance on the Pipe

For Web-serving tests, I used the supplied StarNine WebStar server on the Workgroup Server and Netscape's Enterprise Server for the Network Server. I tested both machines in a live environment with a dedicated 1.544-Mbps T1 connection for the Workgroup Server and a dedicated 45-Mbps T3 connection for the Network Server. The 8550 had no problem saturating the T1 circuit and could easily handle larger pipes, and it kept pace with an SGI Indy server costing twice as much. The 700, using a 100-Mbps Ethernet PCI card, likewise had no problem filling all 45 Mbps of the test T3.

Storage to the Max

Big servers need big disks, which both the Workgroup Server 8550 and Network Server 700 supply in spades. Managing those disks can be a problem, however. The 8550 addresses the problem via AppleRaid, which supports RAID Level 0 (high-speed access) and RAID Level 1 (mirroring); you can choose speed or reliability, but not both. AppleRaid is well documented and easy to use.

The 700's disk storage uses an AppleTalk-based configuration tool that runs on any network Mac. The utility lets you partition, initialize, and reorganize drives; and configure RAID; all without executing Unix commands. If you need or want to invoke a Unix command, a CommandShell utility lets you do so remotely via AppleTalk. The Disk Management Utility lets you combine multiple physical disks into a single logical volume—something impossible under the Mac OS.

The Last Word

If you need a beefy departmental or medium-duty Internet server, the Workgroup Server 8550/200 offers Mac-like ease of use at a low price. The Network Server 700/200 performs high-volume Web and file serving well, but isn't quite as easy to use. Apple has priced these servers to sell; if you're in the market, you can't go wrong with either one.—MEL BECKMAN

Network Server 700/200

RATING: ★★★★/8.3 **PROS:** Rugged, highly reliable hardware; upgradable to SMP; Mac-based administration tools. **CONS:** No built-in AppleShare or Web server. **COMPANY:** Apple Computer (415/996-1010, *http://www.servers.apple.com*). **LIST PRICE:** $11,800.

Workgroup Server 8550/200

RATING: ★★★★/8.2 **PROS:** Inexpensive; easy to set up; excellent performance. **CONS:** Limited RAID capabilities. **COMPANY:** Apple Computer (415/996-1010, *http://www.servers.apple.com*). **LIST PRICE:** $4200.

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Circle 105 on reader service card

Web-Page Editors

VISUAL PAGE AND CLARIS HOME PAGE 2.0 MORE ALIKE THAN DIFFERENT

THE RECENT GLUT OF WYSIWYG Web-page editors brings us two programs with more similarities than differences. Symantec's Visual Page 1.0 and Claris Home Page 2.0 are so closely matched in features, appearance, and performance that I frequently lost track of which program I was using. Although hard-core HTML geeks probably won't be tempted to switch from BBEdit, these new programs are great for building small to medium-size sites and should please fans of the word processor approach to building Web pages.

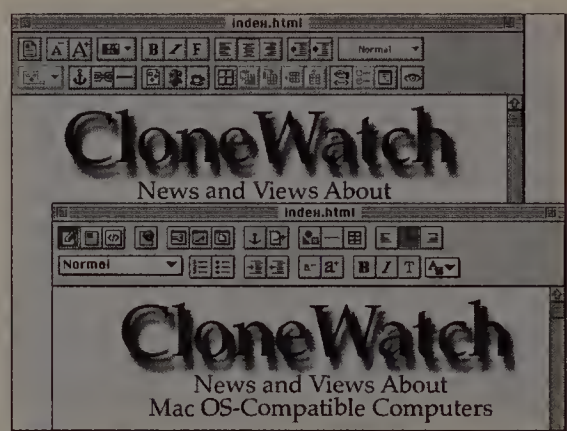
Interchangeable Interfaces

Arriving practically on the heels of the first version (see *Reviews*, December 1996), Claris Home Page 2.0 is, not surprisingly, only a minor upgrade; most of what's new falls into the category of things that should have been included the first time. But if imitation is the sincerest form of flattery, the Claris Home Page team should feel positively fawned-over by newcomer Visual Page: although Visual Page is a bit more polished in the details, it's a near-clone of Home Page.

Both programs offer an interface that mimics a word processor's, with an editing window containing a tool bar for common functions and a forms palette. But Visual Page has more of a "live" feel than Home Page. For example, you can edit your page in either WYSIWYG or HTML form; the HTML source is displayed in a separate window, and changes made in one view are immediately displayed in the other. Visual Page also offers more live-preview features, such as the ability to run QuickTime movies and Java applets in Preview mode without switching to a browser. Home Page 2.0 lets you drag and drop QuickTime movies into your pages and insert other types of multimedia more easily than in version 1.0.

Home Page's best new feature—one shared by Visual Page—is that the HTML tags in Edit Source mode are colorized, making it easier to edit the underlying HTML. When you switch from WYSIWYG to Edit Source mode, the program now tracks where on the page you were working in one mode and takes you to that same place in the other mode. Claris has also added a spelling checker, previewing of background GIFs, and client-side image maps, all features shared by Visual Page. In addition, both programs support the **<font face>** tag.

Visual Page lets you paste in spreadsheets, then converts them to a table; in Home Page, you drag in tab-delimited text from a spreadsheet or database and the program creates a table containing that text. Home Page also gives you more control over table row heights and column widths than did the earlier version and lets you resize frames either with the mouse or from a dialog box.



Separated at Birth? Tool bars in Visual Page (top) and Claris Home Page (bottom) look eerily similar.

Neither program handles JavaScript particularly well. Both let you enter JavaScript in HTML source mode; unfortunately, the code is also displayed in the WYSIWYG view. Home Page's insistence on word-wrapping the code makes it nearly unreadable, while Visual Page has the decency to leave it unchanged.

Site Management and Other Goodies

Visual Page keeps track of all the files and folders in your site and lets you upload or download the site to a remote server (via FTP) with a single command. Home Page 2.0 lets you upload or download individual pages or an entire site and also offers limited link management: you can consolidate all of your site's image files into one directory, and Home Page adjusts the references in your pages to match the new location of the files. Neither program's link management is as flexible as Adobe SiteMill's, however.

Both programs come with a selection of Web-page templates to which you can add text and graphics. Symantec, in keeping with its focus on business users, offers mostly boring, corporate-style templates in Visual Page; Home Page's selection is more interesting, but you're still better off creating pages on your own.

Rounding out the Home Page CD-ROM is a collection of useful goodies, including Blue World's Lasso Lite and a selection of clip art. Perhaps recognizing that this version offers more refinements than revolutionary changes, Claris has posted a free updater for registered Home Page 1.0 users; if you want the whole package of extras, though, you have to cough up $19 for the CD. And while neither program includes a hard-copy manual, Home Page's electronic documentation beats Visual Page's skimpy, unindexed collection of HTML pages.

The Last Word

Both Visual Page and Claris Home Page are good choices for creating small to medium-size Web sites. They lack complete link management, however, so if you're creating a larger site you might want to consider a program like NetObjects' Fusion (see *Reviews*, this issue) or use SiteMill to maintain your links. Visual Page's superior previewing features make page creation a bit more convenient, but Home Page comes with a better bundle of extras. In the end, Visual Page noses out Claris Home Page—but not by much.—TOM NEGRINO

Claris Home Page 2.0

RATING: ★★★★/7.0 **PROS:** Improved HTML editing; useful bundled software; easy to use. **CONS:** Needs better site management and JavaScript handling. **COMPANY:** Claris (408/727-8227, *http://www.claris.com*). **LIST PRICE:** $99.

Visual Page 1.0

RATING: ★★★★/7.2 **PROS:** Good multimedia and Java previewing features; easy to use. **CONS:** Inadequate documentation; site management and JavaScript handling need improvement. **COMPANY:** Symantec (541/334-6054, *http://www.symantec.com*). **LIST PRICE:** $99.95.

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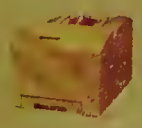

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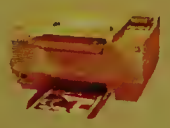

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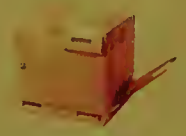

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SuperCard 3.0

MULTIMEDIA OLD-TIMER GETS A SPORTY WEB PLUG-IN

ALTHOUGH ALLEGIANT'S SUPERCard is one of the grand old veterans of the multimedia authoring scene—the first version shipped almost ten years ago—it's anything but stagnant: version 3.0 boasts a dramatically enhanced development environment and impressive new Web capabilities. A few of its cutting-edge features need some sharpening, but overall this is a strong upgrade.

A Remodeled House of Cards

SuperCard 3.0 retains the metaphor of its predecessors: screens are called *cards*, a collection of cards is a *stack*, and you make a project interactive by creating scripts in SuperTalk, SuperCard's programming language. But building a project used to mean frequent switching between SuperEdit—an application in which you created cards, user-interface elements, and scripts—and SuperCard itself, which ran the project and had limited editing features.

Although SuperEdit is still included and is useful for some project-management chores, you do most of your work in a new project editor (see "Shuffling SuperCard"). The project editor sports an up-to-date look and feel: a tool bar gives you one-click access to often-used features and palettes, pop-up tool tips identify the icons, and tabbed dialog boxes allow access to options. New tool palettes let you format text, change object colors and color palettes, and edit element attributes. A new Project Browser window makes it easy to create menus and windows as well as copy and manage resources.

Adding interactivity in SuperCard still entails scripting, but the new ClickScript feature streamlines the process for nonprogrammers. With ClickScript, you use a dialog box to specify an action for the project to take when a given event occurs—for example, to play a QuickTime movie when a button is clicked.

But SuperCard 3.0's enhancements go beyond a prettier development interface. The program can now import GIF, BMP, and JPEG graphics formats and RTF text format. Buttons can contain color icons, and sounds can play continuously in the background. You can also specify that SuperCard maintain a link to an external file rather than importing its data, an option that saves memory and works hand in hand with Allegiant's new Web plug-in, Roadster.

Rocky Roadster

SuperCard's equivalent to Macromedia's Shockwave for Director, Roadster is a cross-platform plug-in module that allows SuperCard projects to play within Netscape Navigator 2.0 and later or Internet Explorer 3.0. (Mac OS and Windows versions, both currently in beta, are a free download from Allegiant's Web site.) The SuperCard-Roadster convoy's strengths are considerable, but they're diluted by some bugs and rough edges.

Shuffling SuperCard SuperCard 3.0's revamped interface features a variety of palettes for altering element attributes, as well as several built-in utilities for automating complex jobs. The Tab Maker utility shown here makes short work of creating tabbed windows.

If your target platform is the Internet, you use the project editor's Roadster playback-emulation mode to simulate how the project will run in a browser. This mode wasn't completely reliable in my tests; I occasionally encountered error messages that didn't crop up when I ran the project within Roadster itself.

When you're authoring for Roadster, SuperCard's Internet menu lets you switch to a browser and run the current project. The menu also contains labor-saving commands, such as one that ensures your project doesn't use features that aren't supported in a browser environment; another command creates an HTML host document containing the **embed** tag that loads the project.

One of Roadster's most significant advantages over Shockwave is its support for streaming (although the next version of Shockwave, due to ship in mid-March, adds streaming support). By writing your scripts with Roadster in mind, you can create a project in which the user-interface elements load first, followed by the text and graphics. You can also preload media elements into a cache. Best of all, implementing these features is usually a simple matter of adding a few SuperTalk statements to your scripts.

You can also use the SuperCard-and-Roadster duo to create hybrid projects, such as a CD-ROM that downloads timely data from a Web site. SuperCard's support for GIF and JPEG graphics files comes in handy here, and its support for RTF means your hybrid CD-ROM can download and display fully formatted text. Another useful hybrid application involves creating a Roadster project that plays back QuickTime movies from a local CD-ROM drive. Alas, SuperCard 3.0 has a bug that prohibits immediate playback of locally stored QuickTime movies through Roadster.

Although the SuperCard-and-Roadster combo needs some fine-tuning before it can be considered a serious contender, its unmatched support for user-interface elements, animation, and sound makes it a simple alternative to Java for advanced Web interactivity. Even if you don't take your projects on the road, SuperCard 3.0 is an excellent upgrade; it's thoroughly documented, well supported, and thoughtfully designed.

The Last Word

SuperCard wasn't designed to play on the same field as Director and mFactory's mTropolis—its animation features fall short, its projects don't run as quickly, and Windows run-time support isn't yet available (although a Windows player is in the works). For projects that rely heavily on standard user-interface elements, however, SuperCard is the right choice.—JIM HEID

RATING: ★★★★/7.0 **PROS:** Streamlined interface; powerful Web-integration features; excellent documentation. **CONS:** Some Web-related bugs; no Windows run-time support. **COMPANY:** Allegiant Technologies (619/587-0500, *http://www.allegiant.com*). **COMPANY'S ESTIMATED PRICE:** $329.

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NetObjects Fusion

DESIGNERS, YOUR WEB AUTHORING TOOL HAS ARRIVED

LEGIONS OF DESIGNERS HAVE been frustrated by the imprecise nature of HTML and the tools for generating it. NetObjects Fusion 1.0 gives these designers what they want: a grid on which they can position text and graphics with pixel-level precision and, more important, Web-page output that matches their dreams. The Power Mac–only Fusion also departs from the rank and file of Web authoring tools by taking a site-centric approach, so although it's not the right tool for dashing off a home page, it's great for creating and maintaining entire sites.

The Big Picture

In Fusion, you create a site and then manipulate it within the program's five views. You begin by laying out your site graphically in the Site View; it displays the site's structure as either an organization chart or an outline, and you can drag and drop pages to reorganize your site. The Page View is where you lay out and add content to individual pages, and the Style View lets you choose from 50 prebuilt styles—which include banners, buttons, navigation bars, backgrounds, text colors, and fonts—or create your own. If you want to update the look of your site, you simply specify a different style. The Assets View lets you manage the site's files and links, and changing or renaming an element here updates all references to that element throughout the site.

Finally, you send your site to a local server (or via built-in FTP to a remote server) using the Publish View. Your site resides in Fusion's internal database until you preview or publish it; only then does the program generate HTML, produce images, and organize the site into a series of folders. You can even have Fusion create both text-only and low-bandwidth versions of your site.

Users of desktop publishing programs like QuarkXPress should feel right at home in the Page View, where most of the action takes place. Fusion's tool palette lets you draw text boxes; add pictures; use simple drawing tools; and add rich media such as Java applets, video, sound, and Macromedia Shockwave files. The text tools support the usual HTML headings, along with font controls and a nice implementation of paragraph styles. The program automatically generates navigation bars and adds them to the headers and footers, burning the name of each page onto the GIF that becomes the banner and adding page names to the navigation buttons. This burned-in text isn't antialiased, but it's a nice touch.

Fusion lacks a visual tool for creating frames; you have to use the program's scripting interface, which lets you add extra HTML to a page (you can also add HTML to individual elements of a page). This scripting interface is also where you add **<meta>** tags, JavaScript, and CGI calls.

Wide Screen Wanted Even on a 17-inch monitor, Fusion is cramped for space. Here you can see how the Web page is divided into header, body, and footer sections, with the Tools and Properties palettes competing with the page for screen space.

Teething Pains

Fusion is remarkably accomplished for a 1.0 release, but it does leave room for improvement in the next update. The absence of a spelling checker is annoying, as is the lack of global search and replace. The program is a screen hog, crowding even large monitors with palettes and page elements (see "Wide Screen Wanted"). Fusion is also more insular than it should be: rather than sucking in an existing site in its entirety, Fusion makes you import it a page at a time. You can't insert a text file into a text box, and text brought in from the Clipboard loses its formatting. And when you import HTML, the results can be frightening; elements from an imported page frequently end up strewn across the Fusion page.

Though the ability to position page elements precisely is a boon for designers, it has its drawbacks. For example, a moderately complex form that took me half an hour to create in Claris Home Page took three hours in Fusion due to all the nudging the form required. Because table support is weak, you can't even cheat by placing your form's fields in a table. And Fusion's FTP client could be smarter: the first time I published my site to a remote server, a configuration problem on the server prevented the files from uploading correctly—yet Fusion reported that the site was published successfully.

While Fusion makes it easy for a designer to create a site, it may be ill-suited to shops that take a more assembly-line approach (in which a designer creates a page and passes it on to a programmer, who adds JavaScript, makes the forms work with CGI calls, and so on). Because Fusion keeps the site in its proprietary format until it's published, passing on part of a site is difficult—not to mention that each participant needs a separate copy of an expensive program.

The Last Word

Many Web designers have been lusting after the ability to lay out page elements with WYSIWYG precision, and Fusion delivers on its promise in a big way (though at a correspondingly high price). In spite of obvious areas for improvement—which NetObjects promises to fix in version 2.0, due out shortly—Fusion will bring smiles to the faces of designers and eliminate the headaches of site management. If you're responsible for a large site, NetObjects Fusion is bound to make your life easier.—TOM NEGRINO

RATING: ★★★★/7.1 **PROS:** Delivers precise, WYSIWYG control over Web pages; excellent automatic site management; changing the look of an entire site is a snap. **CONS:** Flawed importing of existing text and HTML; no spelling checker; forms creation can be a pain; expensive. **COMPANY:** NetObjects (415/482-3200, *http://www.netobjects.com*). **LIST PRICE:** $695.

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Mathematica 3.0

SYMBOLIC MATH COLOSSUS GETS A NOTABLE UPDATE

ADDING A CHAPTER TO THE best-known success story in desktop technical computing, Wolfram Research has released a new version of its venerable symbolic math package. Mathematica 3.0 adds many of the expected features—more integrals, more symbolic solutions to differential equations, Notebooks with HTML options—along with one feature that was less expected: symbolic math notation input and output.

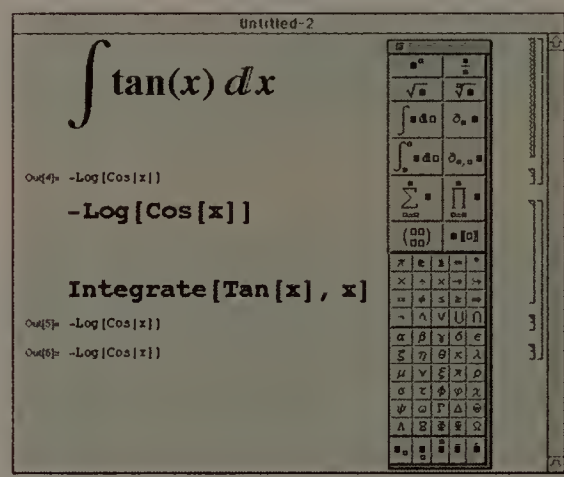
The addition of symbolic notation is a surprise because it's something of an about-face. Stephen Wolfram, the program's developer, once explained why using real math notation to drive Mathematica was a bad idea: it would take not only excessive hardware resources but also a major programming effort to reconcile the computer's symbolic literalism with the ambiguity of traditional math notation. But back then, a fast Mac ran at 33MHz; now that the hardware is no longer a stumbling block, Wolfram's team has devised a palette-based input system that meets the challenge of translating blackboard tradition to machine-interpretable code (see "New Look"). The palettes are intuitive and customizable, and they don't appear to add any computational overhead.

Inside the Machine

The new notational features—the single biggest change from Mathematica 2.2—give you the option of viewing equations in Mathematica's C-like function notation or in traditional typeset style. The new palettes are easily mastered; in fact, they use artificial intelligence so cleverly that you may never actively notice the difference.

Aside from adding the short list of special functions missing from the last version, Mathematica 3.0 solves the 10,000 indefinite integrals in the largest standard handbooks; has seriously improved all aspects of its ability to solve ordinary and partial differential equations, both numeric and symbolic; and has extended its matrix and linear-algebra facilities (adding matrix decomposition and improving symbolic solution of simultaneous linear equations). You can specify numeric precision not only globally in your own operations, but also across platforms in the Notebooks.

In another nod to the importance of the Web, Mathematica's dazzling graphics can now be exported as GIF files. And because the Mathematica language directly controls the Notebook features, you can write a bit of Mathematica code



New Look Mathematica 3.0's palettes for inputting math notation let you display calculations in textbook style, like the integral shown at top, or the standard Mathematica style below it.

to post Notebook parts as dynamic Web pages. Standard add-on packages now included in Mathematica offer regression and some new types of robust statistics—augmenting Mathematica's previously underpowered statistics capabilities—as well as support for pure-math topics in graduate-level algebra.

Although Mathematica 3.0 doesn't address every topic at the frontiers of academic mathematics research—algebraic topology is still essentially blackboard work for human brains—it's safe to say there's not much you'll encounter on your way to a Ph.D. in science or engineering that this program can't handle.

Don't Drop This Book

A new hardbound, 1500-page manual is just one example of Mathematica's bigger-is-better approach: every possible software function, along with the rich interface, installs in about 80MB of your hard drive and 15MB of RAM on a Power Mac. While such demands may be more justifiable from a symbolic math program than from a word processor, for example, not many laptops will make a good platform for this new version, and older hardware will need a serious upgrade.

But Mathematica basically earned its position in the market by being the best choice for high-end users with high-end systems. Mathematica 1.0 was a tall order for the original Mac II way back when, and the tradition continues. Version 3.0 may be an awkward virtual-memory fit on an older Mac with 16MB of RAM, but on a 240MHz system with a 2GB hard drive and 32MB of RAM it's simply a delight.

If you're stuck with yesterday's hardware for now, you can comfort yourself with the knowledge that alternatives to Mathematica are still being produced, upgraded, and energetically supported. The comparable Maple V Release 4 from Waterloo Maple (see *Reviews*, November 1996), for example, also offers real math notation as output, but it includes a command-line version that can run on an older Mac with 4MB of RAM. The MathWorks' numeric math workhorse, MATLAB, also makes modest memory demands, taking a modular, load-as-needed approach. And Waterloo Maple's reincarnation of Theorist (see *Reviews*, June 1995) has emerged as a Web-browser plug-in called MathView; it includes core functions but allows large files of examples and special-purpose calculation methods to reside on a Web site, downloading them only when they're needed.

The Last Word

When it comes to symbolic computation, Mathematica 3.0 has enough added attractions to retain its lead in the math market and drive computer upgrades throughout the sciences. It addresses every important area in applied mathematics, making you wonder what the next version could possibly add.

Mathematica is a first-class solution to the problem of math notation in computing, it fills in the handful of topical gaps in version 2.2, and it will be the standard in desktop mathematical computing for years to come.—CHARLES SEITER

RATING: ★★★★/8.3 **PROS:** Brilliant implementation of customizable palettes for notation; handles all computer-solvable problems identified so far. **CONS:** Unhappy on smaller systems. **COMPANY:** Wolfram Research (217/398-0700, *http://www.wolfram.com*). **LIST PRICE:** $1295.

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WebTV IT and Pippin @World

INTERNET-ACCESS DEVICES STILL COST TOO MUCH

THE IMAGE IS COMPELLING BUT unrealistic: happy families Web surfing in front of their televisions, joined together to explore the Internet and play games. Unfortunately, group Web crawling is like being trapped with a crazed channel-flipper whose remote accesses a million channels—all of them slo-o-o-o-wly. If you still want to experience this for yourself, there are only a few relatively low-cost options. Sony's WebTV Internet Terminal (IT) is fun and easy to use, but I was disappointed by Bandai Digital Entertainment's Pippin @World (for related stories, see "Bursting the Web TV Bubble," *News*, and *NetSmart*, in this issue).

Pity the Poor Pippin

The Pippin @World is aimed squarely at parents reluctant to succumb to Nintendo or Sega Genesis, but unwilling to shell out for a serious computer. My advice: give up and get the game machine, or bite the bullet and buy a Mac. The @World is an aesthetically pleasing but otherwise disappointing compromise.

Based on a PowerPC 603 chip, the @World has a 4× CD-ROM drive, for using Pippin-specific software, as well as a 28.8-Kbps Motorola modem. As with the WebTV, you use a television monitor as the display.

The @World's many parts—the set-top box; a modem; a keyboard with a digitizing tablet; and the handheld, Nintendo-style controller—clutter up a coffee table. Setup is straightforward: connect the peripherals to the box and connect the box to the power outlet, phone line, and TV.

The curvy controller is appealing but complicated; it requires good coordination—the kind that kids have and adults work for. Its hodgepodge of colorful buttons, trackball, and touchpad offers a multitude of input options, and you can type and draw on the separate keyboard and its attached digitizing tablet.

In addition to being an Internet-connection device, the @World also bills itself as a platform for consumer software. However, current Pippin software is disappointing. To some extent, this is a display problem—a television just can't compare with a Macintosh monitor when it comes to clarity and detail. But the software primarily is rewritten Macintosh titles, with nothing innovative or compelling in the lineup. Most of the current titles (expect to see about 20 titles this spring and 30 to 40 by the end of the year) are games or edutainment, although there's also TVWorks 1.1 from Sonoran Blue (*info@sonoran.co.jp*; *http://www.sonoran.co.jp*), a simple package for word processing and graphics, as well as the browser software.

Sony WebTV Internet Terminal (left) and Pippin @World.

Watch IT

Sony's WebTV Internet Terminal is a simple device. (The Philips Magnavox WebTV is the same hardware.) A small box, about the size of a laptop computer, plugs into your TV, a power outlet, and the telephone line.

Hit the Web power button on the remote control, which looks like a standard television remote, and the terminal connects you to the WebTV's proprietary network, which costs $19.95 per month. Connecting to the Web could hardly be easier, and since the IT uses a 33.6-Kbps modem, it's about as fast as home Web access gets.

A wireless keyboard, mandatory for e-mail, costs an additional $80. Two futuristic-looking ports include a special connector for peripherals such as printers or cable modems (none yet support the IT) and a slot for "smart cards" for future commercial transactions across the Web.

Getting Connected

Instead of a typical browser interface, with menu bars and buttons for navigation, the WebTV home page has links to your e-mail, a bookmark list (called Favorites), top sites selected by WebTV, and a search function.

When you surf, you see Web pages without a surrounding interface. As you press the remote's arrow buttons, the active rectangle moves about the page, highlighting links. To get to a Web site, you can click on the remote's Options button and type in the address. Handy scroll keys move quickly up and down full pages, while other keys on the remote let you move back or forward, or return to WebTV's home page. Entertaining sounds optionally accompany every action.

By processing the HTML code on its servers, WebTV does a good job of modifying Web-site components for display on a TV; for example, it enlarges text and graphics, so they look as they would on a computer monitor. Overall, I was impressed by how readable sites were. There were exceptions, of course, but red text on a black background is never easy to read.

Unfortunately, WebTV doesn't provide all the current browser options—for example, sites that use frames are inaccessible. Free downloadable upgrades will help as they become available.

In contrast, the @World's browser software looks more like popular browsers, such as Netscape Navigator or Microsoft Internet Explorer, although currently it doesn't support RealAudio or Macromedia Shockwave. A second-generation browser, which Bandai plans to ship in spring, should add these features. And you can use any Internet

GIBSON

service provider (ISP) with the @World—you're not limited to a single service.

Unfortunately, the @World's image quality is decidedly inferior to the IT's. Although the @World also modifies HTML code to enhance its display, the results are not as successful; for example, text in graphics and Web addresses are sometimes illegible.

Both products require you to sit as close to your television as you would to a computer monitor—it's just not possible to read text from across the room. I found it hard to use either the @World or the IT for more than an hour or so.

The Last Word

Considering that the only things you can do with the WebTV Internet Terminal are access the Web and get e-mail, the price of more than $400 (with the optional keyboard) is expensive. The WebTV service, which adds another $19.95 a month, is mandatory—you can't switch to another ISP if you're not satisfied. Still, I like the WebTV, and if it were closer to $200, I might buy one.

The Pippin @World, meanwhile, costs more than $500 with the keyboard. That's less than a bare-bones Macintosh would cost, but not that much less—and a Mac does a whole lot more and does it all a whole lot better.

Overall, your best bet for low-cost Internet access is probably to buy a low-end Mac (check out used or discontinued models) and pair it with the fastest modem available. It will cost you a little more, but it'll be worth it.—WENDY SHARP

Pippin @World

RATING: ★★/4.7 **PROS:** Attractive design; game titles. **CONS:** Poor image quality; limited software; too expensive. **COMPANY:** Bandai Digital Entertainment (310/404-1600, *http://www.atworld.net*). **LIST PRICE:** $499.99; keyboard $69.99.

WebTV Internet Terminal

RATING: ★★★/6.8 **PROS:** Easy to use; optional entertaining sounds; nice interface. **CONS:** Proprietary network; expensive; no game titles. **COMPANY:** Sony (888/772-7669, *http://www.sony.com*). **LIST PRICE:** $349.95; keyboard $79.95.

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Visual Cafe

FASTER, EASIER JAVA CODING

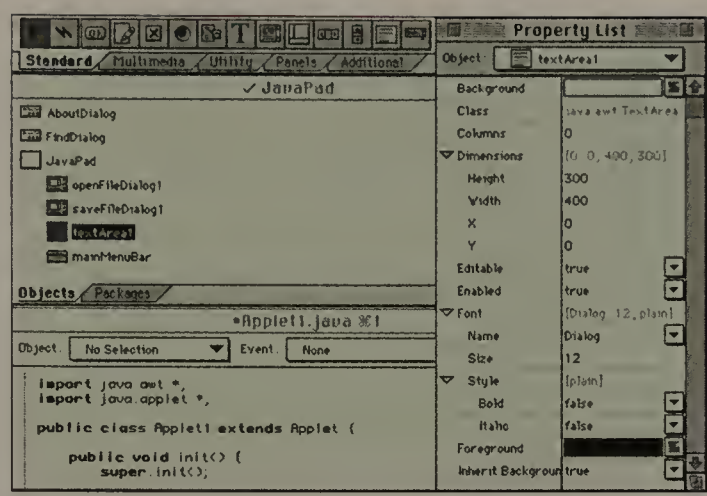
UNLESS YOU'RE ALREADY FAMILIAR with the conventions of a state-of-the-art object-oriented approach, Java can be a daunting language to learn. A good place to start is Symantec's Visual Cafe 1.0, a visual programming tool that takes a unique approach to creating Java applets. In contrast to the more traditional text-editor–style programming environment of Symantec's Cafe DR1 (see *Reviews*, October 1996), Visual Cafe lets you design applets simply by dragging ready-made components from a library into a window.

Visual programming tools for the Mac have had limited success in the past, but Visual Cafe's prospects are better: it will be used mostly to add visual elements to Web pages, a task for which dragging and dropping objects is a perfect match of form to function. Programming scientific numerics in Visual Cafe would be an ordeal, but plugging a scrolling banner into a Web page, a likely use for Java, is a snap.

Besides making it easy to drag and drop the vibrating orange text and other flashy visuals we've come to expect on the Web, Visual Cafe offers tools for doing more pedestrian work—order forms, catalogs, site directories, database queries, and so forth. Preformatted text fields for zip codes, phone numbers, and Social Security numbers—along with tools for adding links, dialog boxes, windows, and frames—save Java programmers from much of the tedium of formatting.

Visual Cafe also simplifies the chore of specifying interactions between interface elements by means of the Interaction Assistant, which lets you choose functions from a dialog box and assign them to buttons you drag into a window or frame. When you see the volume of text your seemingly simple choices produce, you'll be glad the Assistant did the work for you. And when you see the amazing number of classes and objects involved in generating even the simplest applets, you'll be glad Visual Cafe gives you a hierarchical class browser; it's a great way to navigate the wilderness of components you'll amass after only a few days of programming.

If you want faster results than the traditional "Hello, world" programming approach can offer, Visual Cafe is an ideal tool for "borrowing" code. For example, if you find third-party code on the Web or Cafe's built-in tools to be *almost*, but not quite, what you need, you can use the Property List to modify them just by changing a few values (see "Public Property"). You can also make the modifications in straight-text Java from the standard programmer's editing window.



Public Property By tinkering with attributes in Visual Cafe's Property List, you can turn sample applets from Sun and Symantec into distinctive custom applications.

The only clouds in Cafe's sunny skies are the kinds of glitches typical of beta software. Most of the problems have to do with memory allocation: Cafe displays nonsense out-of-memory errors and crashes when virtual memory is turned on; the solution is to run the program with at least 24MB of RAM. Thanks to some minor incompatibilities with Sun's original Java specification, some Web-downloaded applets run oddly or simply crash.

The Last Word

Visual Cafe is, at least for beginners, the most entertaining and productive Java package available. It's a work in progress, but whether you're creating applets from scratch or tinkering with the Web's abundant Java examples, this is a great set of tools.—CHARLES SEITER

RATING: ★★★★/7.2 **PROS:** Lets beginners create Java applets quickly and with no programming. **CONS:** An array of minor glitches. **COMPANY:** Symantec (541/334-6054, *http://www.symantec.com*). **LIST PRICE:** $199.95.

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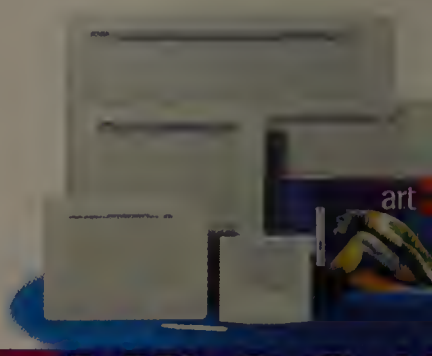


WACOM

MYOB Accounting 7

PACKAGE OFFERS EASE OF USE, POWER

FINDING AND USING ACCOUNTING software has always been daunting, and with Intuit's abandoning Macintosh development of its popular QuickBooks package (see *Reviews*, June 1996), small companies are scrambling to find an alternative. Thankfully, BestWare's MYOB Accounting continues to offer an integrated package with a broad range of features and an approachable, if sometimes quirky, interface.

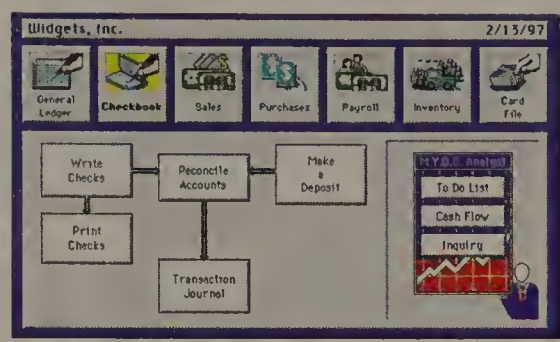
Getting started is straightforward; I installed and configured MYOB in less than 30 minutes. The New Data File wizard collects information about your company and accounting preferences, and offers a selection of 100 templates for your chart of accounts. Another wizard helps you configure the application and enter initial data, and flexible import routines provide access to Quicken records or tab-delimited text files.

MYOB's interface revolves around cartoonish Command Centers for General Ledger, Checkbook, Sales, Purchases, Inventory, Payroll, and Card File functions. Familiar-looking forms simulate checks, invoices, and other documents, insulating you from the intimidating details of double-entry accounting. Although quite usable, MYOB's interface feels less professional than QuickBooks', and makes navigating between functions and transactions slightly more difficult.

MYOB handles all the standard accounting areas but beefs up each so it's truly useful. The invoicing and purchasing modules allow you to assign each invoice or purchase order a different format, and MYOB allows significant customization of forms using a powerful editor.

MYOB's excellent payroll option includes flexible configuration of unlimited categories for wages, accruals, deductions, expenses, and taxes; the Payroll module also includes all state and most local tax tables. MYOB also handles project budgeting and job costing with ease.

When it comes to inventory, MYOB outclasses the competition, tracking not only quantities on hand but also those on order and already committed. You can configure items to have different buying and selling units—a small but significant feature. MYOB supports multiple costing methods, batch price updating,



In Command MYOB's Command Centers provide quick access to logically grouped functions.

and automatic back-order handling.

Unlike QuickBooks or Peachtree Accounting (see "Accounting for Growth," January 1996), MYOB allows either changeable records, which can be interactively edited, or unchangeable records, which require reversing entries. MYOB also offers locking of completed months and lets you define individual passwords for each screen. MYOB's journals allow quick scanning of transactions and their distributions; analysis windows make it easy to project cash flow or evaluate the status of accounts payable or receivable. A handy to-do list groups all upcoming events into a single window.

MYOB doesn't support multiple simultaneous users and thus is inappropriate for larger accounting departments. Although it offers more than 100 predefined reports, its filters are less powerful and consistent than those found in QuickBooks; they are, however, easier to use. And MYOB includes no time tracking facility, instead offering a link to the popular Timeslips (see *Reviews*, January 1997).

The Last Word

Though it's not the slickest package around, MYOB Accounting 7 offers the broadest and strongest feature set of any low-end accounting package, including top-notch security, inventory, and payroll features. Many small businesses will find it an excellent answer to their accounting needs.—J.W. DAVIS

RATING: ★★★★/8.5 **PROS:** Broad feature set; strong security and inventory features; good value. **CONS:** Quirky interface; no multiuser capability. **COMPANY:** BestWare (201/586-2200, *http://www.bestware.com*). **COMPANY'S ESTIMATED PRICE:** $89.95; with payroll option $139.95.

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Wingz 2.1

POWERFUL TOOL DISGUISED AS A SPREADSHEET

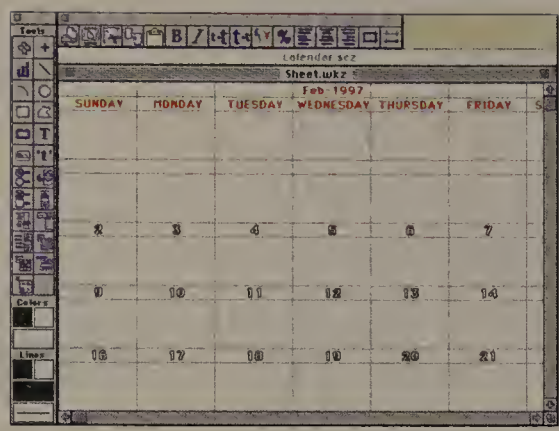
MAC OLD-TIMERS MAY WONDER what became of Wingz after its brief incarnation as the engine inside Claris Resolve. Well, Wingz is back—with expanded features for developers—as a general-purpose spreadsheet adapted for work with SQL databases. In its new form, Wingz 2.1.1 is an impressive spreadsheet. Its small set of tools offers the right combination for most calculation and graphing tasks, without clutter from seldom-used elements. Even more impressive, Wingz isn't a big, bloated, application—when you click in a cell, you see the results immediately.

The basic Wingz package—including the HyperScript 1.1 Toolkit—contains enough examples to get started on programming and basic activities (see "It's About Time"). Serious work on SQL connection calls requires a $1495 extended Developer's Toolkit, which provides the necessary script examples and interface programs along with construction aids and debugging tools.

If you need more clickable commands than Wingz's lean-and-mean tool bar provides, a feature called HyperCons offers an expandable palette of icons you can assign to built-in features or to user-defined HyperScript commands. Though you can automate your daily spreadsheet tasks with HyperCons, they're most useful for defining easy-to-use interfaces for otherwise-complicated database queries.

Similarly, Wingz's new streamlined menus can be toggled back and forth between advanced and novice versions; the novice menus and a small palette of query-oriented HyperCons would make a solid interface for a typical catalog/invoice/order-form database client.

For nonprogrammers who need just a spreadsheet, Wingz's features are a sharp contrast to Microsoft Excel's huge set of capabilities, many of which work quite well in the Windows version but have grown bigger and slower in the Mac port (OLE being a key example). Although Wingz offers Unix and Windows versions and sports a few quirky non-Mac details—you can have several dialog boxes open and active at the same time, for example—it's been optimized for speed, and its new features (new graph types, with extra shading, lighting, and presentation options) don't get in the way of efficient performance.



It's About Time Wingz's HyperScripts use simple English-like syntax but run astonishingly fast. This calendar was generated from a Wingz spreadsheet using a prebuilt script.

The downside of becoming a Wingz/HyperScript master is that you've gained specialized skills in a field where Microsoft owns more than 90 percent of the market. On the upside, you can tackle cross-platform development using Informix or other big-iron SQL databases as the server and Wingz as an efficient client-side delivery or query system. (Some database-connection components, such as ODBC, are Power Mac–specific, though.) And more important, Wingz is a modern spreadsheet that runs comfortably on a laptop, in 4MB of RAM.

Owners of previous Wingz versions can upgrade for $89; a competitive upgrade runs $179. At press time, I received a beta of an upgrade slated for mid-1997 release. This new version will include a Save As HTML option and direct import from and export to Excel 5.

The Last Word

Rather than competing with Excel for office spreadsheet dominance, Wingz 2.1.1 offers a programmer's spreadsheet of impressive power. If you need easy links to large-scale databases, or a powerful spreadsheet that runs on low-memory systems, Wingz is a solid bet.—CHARLES SEITER

RATING: ★★★★/8.0 **PROS:** Fast and powerful; easy HyperScript connection to enterprise databases. **CONS:** Minority position in Excel-dominated world. **COMPANY:** Investment Intelligence Systems Group (913/663-4472, *http://www.wingz.com*). **LIST PRICE:** $399.

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Dave

MAC FILE SHARING FOR WINDOWS LANS

MICROSOFT WINDOWS NT'S built-in AppleShare server lets you access Windows NT file servers and printers as if they were AppleTalk devices. Sounds easy enough. Unfortunately, you have to persuade your network manager to install and configure the thing—not easy if you're a visiting consultant or temporary worker—and you can access only Windows NT servers, not Windows for Workgroups or Windows 95 machines.

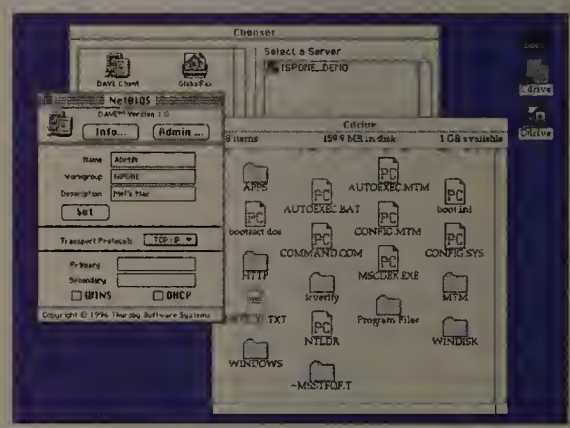
Thursby Software's Dave 1.0 solves these problems by making your Mac look like a Windows machine to the rest of the network. You can access—but not serve—files and printers on any Windows machine via a LAN or dial-up connection, all without asking the network administrator for special treatment.

Dave's clear user guide explains Windows file sharing from a Macintosh perspective. Because Dave uses TCP/IP, you can share Windows files across the Internet or via a dial-in PPP connection to a Windows Remote Access Server (RAS). Configuration is simple: you enter the same Windows file-sharing parameters any Windows user would.

You access Windows file servers via the Chooser; selecting the Dave Client icon brings up a list of available servers. Choose from an available server and log in with a user ID and password, and you're presented with a list of shared items—documents, folders, volumes, and printers. Each file item you share appears as a document or folder icon on your desktop. You can choose any LaserWriter 8–compatible PostScript printer attached to a Windows machine as your local printer. Other than the ugly all-uppercase file names and PC icons, the Dave experience is very Mac-like.

Windows stores files differently than Mac OS does—its file names are shorter and case-insensitive, there are no internal file types, and text files don't follow Mac line-ending conventions. Dave relies on the Mac OS's built-in PC Exchange facility to handle the tricky details, such as translating file names and associating files with applications based on their file-name suffixes (you can specify, for example, that all files ending in .DOC be opened by the Mac version of Microsoft Word). Unfortunately, PC Exchange offers limited support for translating text files between Windows and Mac formats; you must handle most text-file translation within your text-editing application.

Dave has a few bells and whistles—the ability to store Mac files on Windows servers, support for Windows WinPopup messaging, and a slew of performance-tuning options—but also some rough edges. Error messages are sometimes vague and misleading. If your Windows server password expires, Dave won't let you enter a new password; it displays a cryptic "NetBIOS Internal Error" message instead. Nor does Dave automatically update shared folder windows. You must close and reopen a window in order to see changes made by other users.



Dave Does Windows Dave lets you mount any shared Windows volume as if it were an AppleShare volume. You can then work with the volume just as you would a PC floppy or other removable media.

The Last Word

Dave lets you live in the Windows world incognito—nobody need know you're running a Mac. Its ability to share files over the Internet surpasses even current AppleShare capabilities, and its support for WinPopup messaging is a nice touch. Not being able to serve files is an inconvenience but not a catastrophe—you can always set up a repository folder for yourself on a Windows server. If you must interact with the Windows world, let Dave do it for you.—MEL BECKMAN

RATING: ★★★★/7.3 **PROS:** No Windows configuration required; TCP/IP support; dial-up capability. **CONS:** Client only—no server functionality; no automatic text-file conversions; confusing error messages. **COMPANY:** Thursby Software Systems (817/478-5070; *http://www.thursby.com*). **LIST PRICE:** $179.

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LightWave 3D 5.0

PRO-LEVEL ANIMATION PROGRAM LACKS INTERFACE ELEGANCE

LIGHTWAVE 3D COMES TO THE Mac trailing a long list of screen credits—M&Ms commercials, the James Bond movie *GoldenEye*, and the *Star Trek: Voyager* TV series among them. Until now, the program was available only for the Amiga, Windows, and Silicon Graphics platforms; version 5.0 is the first one that runs on a Mac (Power Mac only). While that makes it a good candidate for multiplatform production environments, Mac aficionados may be frustrated by LightWave's awkward interface and un-Mac-like ways.

Flight Path LightWave doesn't let you directly edit motion paths in an animation. To change this 747's flight plan, for example, you have to move the object to alter the location of the keyframe.

LightWave 3D consists of two separate programs: a Modeler for building 3-D objects, and a Layout mode for assembling, rendering, and animating scenes. Shaded QuickDraw 3D previews are available in both modules.

In the Modeler you'll find editable primitives; tools for extruding, skinning, and lathing shapes from splines; Boolean functions; and a Metaforms tool that adds spline-mesh patches to basic shapes, producing compound-curved objects. The MetaNURBS tool transforms four-vertex polygons into editable NURBS patches, letting you create organic models with extremely smooth surfaces.

The Layout program's excellent texturing tools let you apply textures to individual polygons and control variables such as specularity, reflectivity, and luminosity. To animate objects, you simply specify the keyframes and LightWave produces a spline animation path automatically. However, you can't edit (or draw) an animation path directly; you must move the model to reposition the keyframe point and fine-tune the path by trial and error. Nor can you drag keyframes in the scene sequencer, as you normally can with Mac animators.

Layout lets you link objects hierarchically and supports inverse kinematics, so you can constrain object motion to user-defined limits. You can also endow objects with Bones, an internal structure that can distort an object's surface to produce character-animation effects.

Unfortunately, LightWave's lack of integration undermines its efficiency. For example, to change an object's surfacing scheme during animation—say, to add a stripe to its side—you have to export it back to the Modeler to rename its polygons; ditto if you want to alter its shape. Integrated programs that let you edit models on the fly, such as Macromedia's Extreme 3-D, Fractal Design's Ray Dream Studio, and Specular's Infini-D, have it all over LightWave.

LightWave's interface is visually cluttered and a bit unwieldy until you memorize all the keyboard shortcuts. The two modules don't behave consistently: the Modeler lets you undo actions, while Layout doesn't; basic functions, such as Open and Save, are in different places; and Layout has two Save commands, one for scenes and the other for objects. LightWave isn't yet completely at home on the Mac; inadvertent mouse-clicks can cause it to lose the cursor, hang, and even crash.

The CD comes with a nice assortment of 3-D objects, surface textures, and even completed scenes you can use in your own work. Less welcome is LightWave's hardware key, a drawback for anyone with a lengthy chain of ADB devices.

The Last Word

LightWave 3D offers competent, professional-level modeling, rendering, and animation tools, but it's an acquired taste. Spend the time necessary to become proficient with LightWave, and you may come to love it. Viewed from the Mac perspective, though, it leaves something to be desired.—CARLOS DOMINGO MARTINEZ

RATING: ★★★/6.7 **PROS:** Pro-level modeling, rendering, and animation; cross-platform compatibility. **CONS:** Less-than-elegant interface; ADB hardware key. **COMPANY:** NewTek (303/448-9700, *http://www.newtek.com*). **LIST PRICE:** $1495.

"Honey-bunch, I know you're going to love my Macintosh as much as I do."

"But, sweetness, I already have a PC printer."

"Snookums, I can't part with my Mac."

"Well, sugarplum, we're not wasting money on a new printer."

"Can we talk about this when we get home, DEAR?"

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CyberSound Studio

A DREAM MUSIC STUDIO FOR $100

MAKING MUSIC ON THE MAC IS great fun—and all you need is a synthesizer (about $2500), a MIDI interface ($75), MIDI cables ($20), and recording software ($400). At those prices, no wonder people aren't rushing to set up their own Mac music studios. But InVision Interactive has found a way to pack all that gear into a $99.95 package known as CyberSound Studio 2.0 (1.0 was called CyberSound VS). InVision's bright idea was to use the Mac's PowerPC chip to create the sounds and reduce the synthesizer itself to an 18-inch-long, three-octave keyboard. (The keyboard is ideal for use with Coda's Finale and other notation programs.) Not all the kinks have been worked out, but the CyberSound package offers 80 percent of the features and sonic realism of a Mac MIDI music studio costing 30 times as much.

After installing the 50MB worth of samples (instrument sounds from actual recordings) from the included CD, you hook up the synthesizer keyboard to your modem port. (You can also add sounds by pressing your Mac's keys, clicking on an on-screen keyboard, or even *singing*, provided you have a mike and good pitch.)

Next you launch CyberPlayer, an extremely easy-to-use sequencer (recording program) with 16 tracks. A pop-up menu lets you choose from among 223 samples for each track—orchestral sounds, pianos, rock instruments, drums, techno-pop samples, and even sound effects like applause and gunshots. (InVision's $40 Instrument Library CD contains 279 more.) More than half are extremely realistic, some are a tad cheesy, but all are far superior to Apple's own QuickTime Musical Instruments.

With this setup, you can do just what the pros do: build your own arrangements line by line. You record the bass part, rewind, add the drums, and so on. You can also play along with any of 70 arrangements that lack only your solo line. Various "one-finger arrangement" features let even musical novices have a blast. And CyberPlayer creates standard MIDI files that you can distribute to any other MIDI musician; similarly, CyberPlayer can play any MIDI file from the Web.

If CyberSound worked perfectly, it would do for music what the Connectix QuickCam did for video. Unfortunately, it has some drawbacks that will keep it from being a blockbuster. For example, you can edit the notes you've played in various ways: delete them, change their pitch, quantize them (clean up rhythmic imperfections), adjust their tempo and meter in midsong, and so on. But you do so by typing into dialog boxes, whereas the $400 sequencers offer easy graphic

CyberSequencer To change the instrument sounds for a track, just choose from the pop-up menu to the right of each track.

interfaces for such editing. And the mini keyboard isn't touch-sensitive, so you can't get louder or softer as you record.

By far the most troubling drawback, however, is what the company calls a "latency problem." This quirk of Apple's Sound Manager software means you don't hear sound until a split second after you've pressed the key, making it impossible to record precise rhythms.

The Last Word

CyberSound Studio is great for the young, the tolerant, and the thrifty. When InVision and Apple fix the latency problem, CyberSound will be a must-have for multimedia producers, Webmasters, PowerBook musicians, and anyone who wants to hear a dozen orchestras performing inside a Mac.—DAVID POGUE

RATING: ★★★/6.8 **PROS:** Includes everything (keyboard, adapters, and software); great sounds; sensational bargain. **CONS:** Notes are delayed a split second; some buglets; PowerPC required. **COMPANY:** InVision Interactive (415/812-7380, *http://www.cybersound.com*). **LIST PRICE:** $99.95.

The above images were created in Illustrator, exported as EPS files into PageMaker and printed on an Apple Color StyleWriter 2500.

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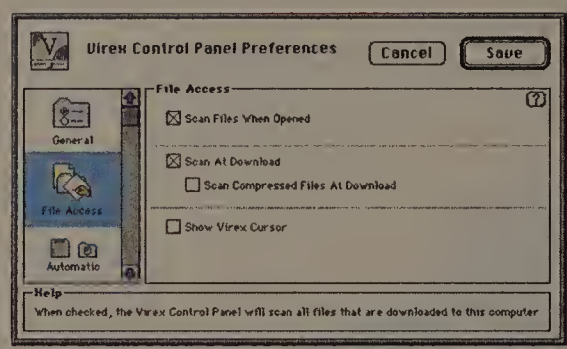
Virex 5.7

VIRUS PROGRAM CHECKS DOWNLOADS

WHEN YOU DOWNLOAD FILES from a major online service, such as America Online or CompuServe, the system operators check them for viruses. When you get files from the Internet, you have no way of knowing what condition they're in.

With an eye toward the threat of virus infections from the Internet, Datawatch has released Virex 5.7, with enhanced Scan At Download features. The previous version checked downloaded files transferred to folders or disks you specified; Symantec's SAM 4.5 offers a similar feature (see *Reviews*, February 1997). The newest version of Virex, though, checks all of your downloads automatically.

This added convenience extends to the other new features, too. A DropScan application lets you drag and drop files, folders, and disks for scanning, or you can activate scanning functions via a handy Control Strip module. Virex now automatically detects—and offers to repair—files infected with Microsoft Excel and Word macro viruses when you open the file; other virus programs make the repair process a separate operation. If you choose not to repair the file, Virex prevents it from opening.



No User Intervention Required Virex 5.7 offers the option to automatically scan files transferred to your computer via modem or from a network.

When I examined the previous version of Virex, 5.6.8, I was disappointed with its severe impact on system performance (see "Secure Your Mac," November 1996). Application launch times were noticeably slower than on unprotected systems, and keyboard entry speeds took a nosedive. The newest Virex works much faster than the previous version—in fact, I was hard-pressed to see any slowdowns in start-up times, application launch times, or routine tasks such as entering text and opening and saving documents. Other than a progress window after inserting a floppy disk and the telltale Virex icon at start-up, I was never aware of the program's presence.

Virex comes with a handy installer that can check all your drives for viruses before installation. The manual is well written and profusely illustrated, but hasn't been updated for the new version. The changes are briefly described in a Read Me file.

As new viruses are discovered, Datawatch posts free online updaters to the program's detection strings. You can also subscribe to an automatic update plan at $75 per year to receive the latest detection strings and program updates.

The Last Word Virex has overcome the performance problems that plagued its previous version, and offers the largest range of virus-detection features of any program. It's faster and more stable than SAM 4.5, and its ability to automatically check downloaded files puts it ahead of McAfee VirusScan and Dr. Solomon's Anti-Virus Toolkit (see *Reviews*, December 1996). With version 5.7, Virex returns to the top tier of Mac virus-protection software.—GENE STEINBERG

RATING: ★★★★/8.8 **PROS:** Ultrafast virus scans; automatically scans downloaded files; has no noticeable impact on system performance. **CONS:** Manual doesn't describe newest features. **COMPANY:** Datawatch (508/988-9700, *http://www.datawatch.com*). **LIST PRICE:** $99.

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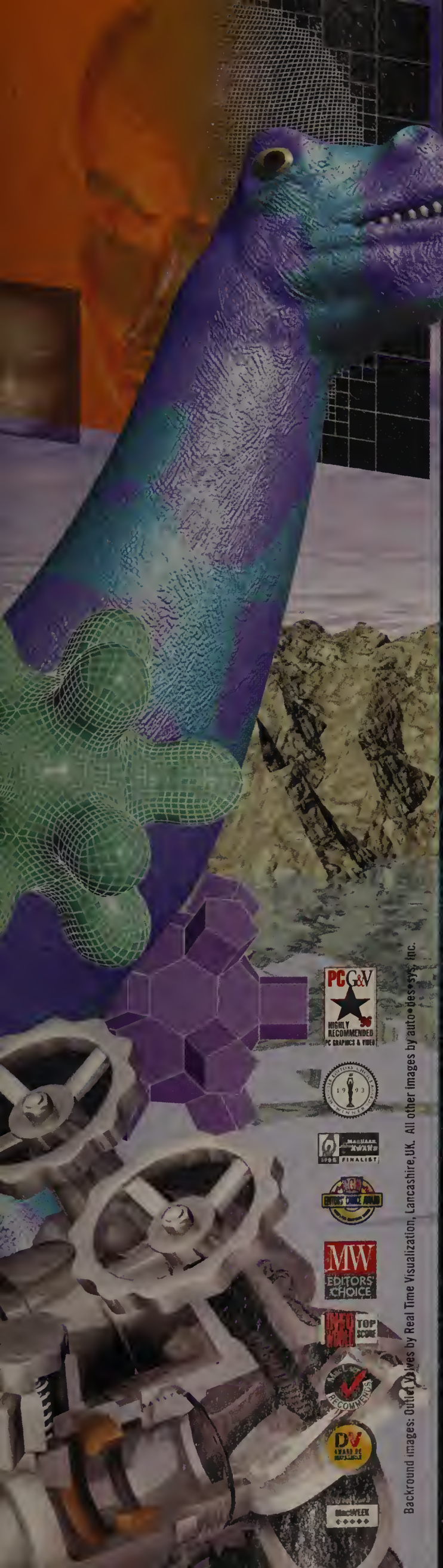

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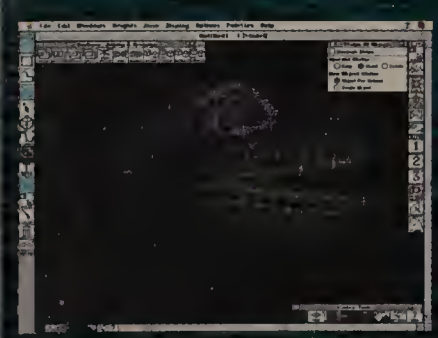

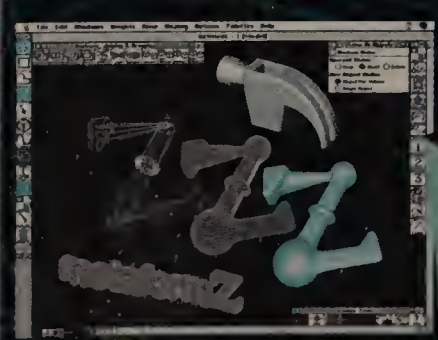

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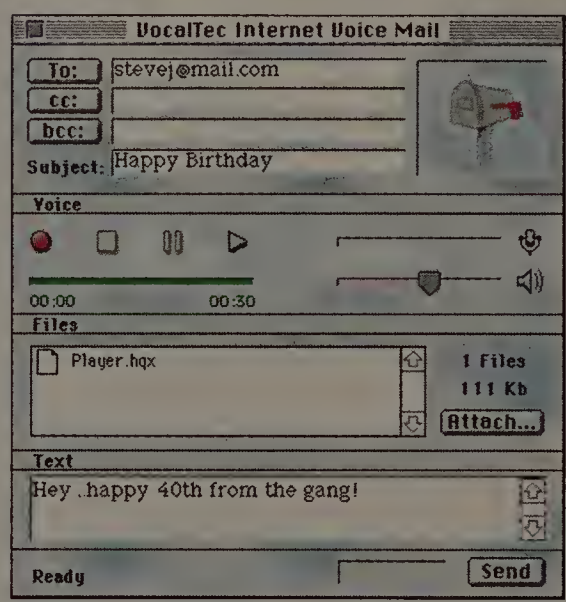
Internet Voice Mail 3.0

E-MAIL UTILITY MISSES THE MARK

AS CONVENIENT AND RELIABLE as e-mail is, it's not without pitfalls. If the person at the other end misunderstands the tone of your message, for example, the consequences can be embarrassing . . . or worse. VocalTec's Internet Voice Mail 3.0 tries to solve the problem by letting you attach sound bites to e-mail; unfortunately, limited functionality and a serious bug prevent the program from delivering on its promise.

Internet Voice Mail is a stand-alone application that lets you attach text and sound recordings to an e-mail message (see "Your Master's Voice"). The recipient needs not only an e-mail client to read the message and download the attached sound file, but also a separate player application to listen to the recording. (Internet Voice Mail comes with Mac and Windows players that you can attach to your e-mail.)

Even for a program that doesn't claim to be a dedicated e-mail application, Internet Voice Mail is surprisingly limited. For example, you can't import e-mail addresses into the address book or send mail to group addresses. To use Internet Voice Mail, you must have an Internet account with a dedicated mail server; if you use a commercial service like America Online, you can receive voice messages but you can't send them. And because Internet Voice Mail is send-only, the recipient needs a copy of the program just to reply to your e-mail (the program includes a second user license).



Your Master's Voice Like a tape recorder, Internet Voice Mail has simple controls that let you record and preview your voice messages before sending them.

I tested Internet Voice Mail with a variety of Internet connections and systems, and voice quality at the receiving end was uniformly good (although I would have preferred to choose the sound compression level myself). I also encountered two bugs: Internet Voice Mail crashed every time I attempted to attach files to messages on my Quadra, a known problem with 680X0 Macs (VocalTec is working on a fix). And the program refused to let me reopen the message window after closing it, forcing me to quit and relaunch.

The Last Word Although Internet Voice Mail basically does what it promises, it doesn't offer much that you can't get less expensively (or free) somewhere else; a host of freeware and shareware applications let you record sounds in a variety of file formats and attach them to e-mail messages. If you're still interested in Internet Voice Mail, though, you can download a demo copy from VocalTec's Web site.—FRANKLIN TESSLER

RATING: ★★/3.8 **PROS:** Easy to use. **CONS:** Lacks some essential features; buggy. **COMPANY:** VocalTec (201/768-9400, *http://www.vocaltec.com*). **LIST PRICE:** $29.95.

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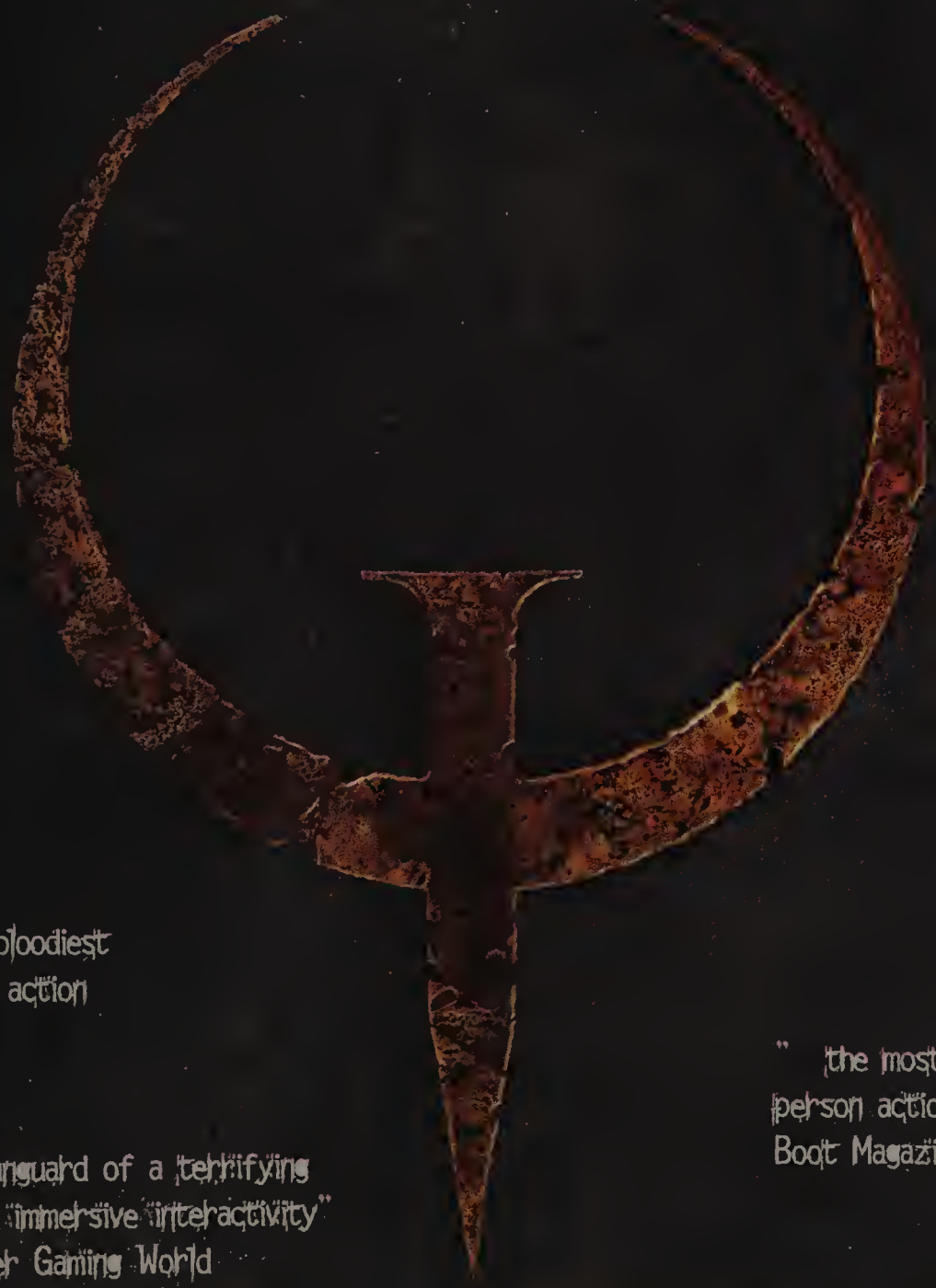

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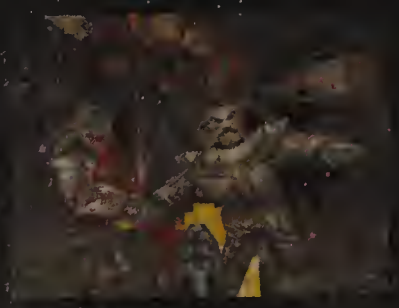

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Insta.html

FAST BUT FLAWED WEB PAGES FROM FREEHAND LAYOUTS

DATABASES, PIMS, DESKTOP PUBlishing programs . . . it seems these days any kind of file can be converted into HTML. With the release of Insta.html 1.0, Trailer Parc Technologies has added Macromedia FreeHand to the list. This plug-in lets you turn layouts and illustrations created in FreeHand 7 into Web pages using a simple export command. Unfortunately, Insta.html doesn't deliver on its promise of instant, trouble-free FreeHand-to-Web conversion.

Insta.html adds five new commands to FreeHand's Xtras menu. These commands let you select a background color or image for the exported pages, a destination folder for the exported files, names for the resulting files, and the format for each graphic. To export the files as Web pages, you simply choose Output Document; Insta.html converts the text in your FreeHand document into HTML and the images into JPEG, GIF, or Macromedia Shockwave files, preserving the font styles, alignment, and colors used in the original illustration. And because Insta.html supports the

HTML to Go Insta.html adds an HTML submenu to FreeHand's Xtras menu, giving you access to commands for configuring and exporting Web pages.

<font face> tag, you can specify the font the browser will use to display your text.

But although Insta.html does a good job of preserving the original layout, the overall conversion is far from flawless. For example, because the program doesn't reduce the exported images' palettes the way it should, the resulting GIFs and JPEGs are of exceedingly poor quality, with muddy colors and heavy dithering. You could export all your images as TIFFs instead, then convert the graphics manually; however, that would require additional image-editing software.

You can embed links in the exported documents using FreeHand's URL Editor palette, but you can attach a URL only to an entire object or chunk of text; you can't link a portion of the object (to create an image map) or a single word within a chunk of text. And while you can insert Shockwave files, ActiveX files, and Java applets into a page before exporting it, the program lacks tools for handling such standard Web-page features as frames and forms.

The extensive but poorly organized manual tends to be long-winded on general topics and ambiguous when it comes to the nuts and bolts of the program. And because the documentation exists only in HTML, you can't even print it easily.

The Last Word With its lack of tools for creating frames and image maps and converting graphics, Insta.html forces you to use additional programs if you want anything but the most basic of Web-page designs. For what it offers, the price is just too high.—JOSEPH SCHORR

RATING: ★★/4.9 **PROS:** Faithfully reproduces FreeHand layouts in HTML; supports **<font face>** tag. **CONS:** Can't reduce palette of exported GIF and JPEG files; no support for image maps, forms, or frames; weak documentation. **COMPANY:** Trailer Parc Technologies (415/248-1350, *http://www.trailerparc.com*). **LIST PRICE:** $179.

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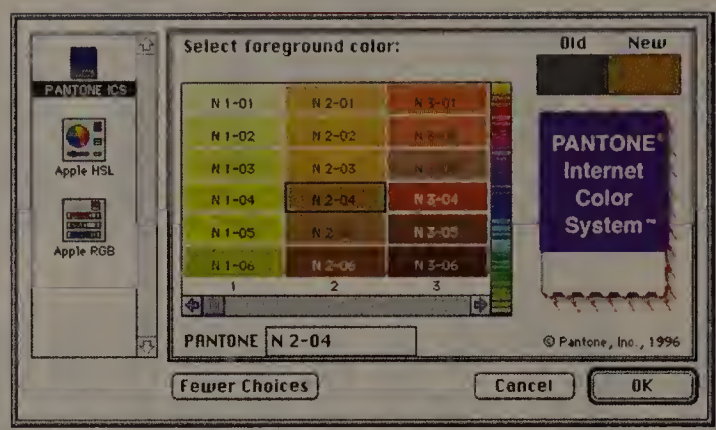
ColorWeb

PANTONE'S COLOR PICKER AND SWATCH BOOK MOVE TO THE WEB

NOTHING DRAWS PEOPLE INTO A Web page like color. A shocking-pink background here, a few purple titles there, and suddenly you've turned that boring financial table into something worthy of a Las Vegas casino. But how do you make sure millions of Web surfers see the same purples and pinks you've so carefully (and tastefully) specified?

Pantone has an answer in ColorWeb 1.0, a simple, inexpensive product that makes it easy to specify any of the 216 Web-safe colors—that is, those colors that can be displayed without dithering on any Mac, Windows, or Unix monitor. It gives you two ways to access the Pantone Internet Color System (PICS): a color picker and a printed swatch book.

You can use the color picker with any program that supports the Apple Color Picker extension (part of System 7.5). After you install it, the PICS color picker becomes an option within the Apple Color Picker. In Adobe Photoshop, for example, it comes up when you click on the foreground or background color box. The colors are displayed in a grid of 6 rows by 36 columns, ranging from yellow on one side to black on the other. ColorWeb displays only three columns at a time, however; to get to other colors, you either scroll or click on a vertical color ramp (see "PICS Your Color").



PICS Your Color You can view colors by clicking on the horizontal scroll bar or the vertical color ramp.

The swatch book is intended for use with HTML text editors that don't support the Apple Color Picker. It gives you printed approximations of the 216 Web colors, along with their PICS numbers and the RGB, CMYK, hexadecimal, and Pantone Hexachrome values needed to re-create them. To specify a color, you simply look it up in the swatch book and enter the appropriate value. The swatch book also comes in handy when you want to match a certain printed color; just keep in mind that the color you select will only be a rough approximation, given the inherent differences between RGB and CMYK color.

Some Web sites (such as Lynda Weinman's at *http://www.lynda.com*) offer free palettes that display RGB and hexadecimal values for the 216 Web-safe colors. You can download and print the palettes to create a chart that functions as a swatch book, but you forgo the convenience of selecting colors directly within your authoring program.

The Last Word ColorWeb has carved out a simple niche for itself, but it fills this niche well. If your Web authoring tools support the Apple Color Picker, ColorWeb is definitely a worthwhile addition (especially given its tiny price tag). If not, you might do just as well with one of the freely downloadable palettes.—STEPHEN BEALE

RATING: ★★★★/7.0 **PROS:** Inexpensive; easy to use. **CONS:** No printed manual; less useful if authoring program doesn't support Apple Color Picker. **COMPANY:** Pantone (201/935-5500, *http://www.pantone.com*). **LIST PRICE:** $29.95.

Command & Conquer

WAR GAME DOESN'T DISAPPOINT

COMMAND & CONQUER SERVES UP a fictional future where the United Nations' Global Defense Initiative fights against a powerful terrorist group, the Brotherhood of Nod. As the strategic leader for either side, you must command your troops through increasingly complex missions to save—or destroy—the status quo.

Command & Conquer is easy to learn but difficult to master. Its military units include a multitude of infantry, as well as a variety of mechanized troops and aerial squadrons. Each unit has its particular capabilities, and some may only be built by one of the two combatants. Sound effects vary from unit to unit, and violent players will thrill to the gruesome sound of tank units squishing infantry.

Because of the vast number of units you must control, you'll appreciate the ability to quickly group troops into teams you can summon with user-definable keystrokes—a great aid in precision maneuvers. The grouping feature is also particularly helpful when launching massive assaults, which can otherwise block strategic passages and cause units to wander around aimlessly, or worse, blunder into enemy troops.

Cry Havoc Command & Conquer lets you send masses of troops to crush all who oppose you.

Like other games of its genre, Command & Conquer requires you to build and maintain a base for mining raw materials, obtaining supplies, and building troops. The building interface is a simple point-and-click sidebar, which allows you to keep most of your attention on the battle. Home bases are subject to a particularly nasty attack—the opposing player can send an engineer to take over a building and then promptly sell it, depriving you of the building and giving the enemy more cash for weapons. Trying to determine which of your units is the engineer can be a problem, though—the graphical representations of units are so small that telling one from another in the heat of battle can be tough.

Whether you ally with friends against a common computer foe or play against each other in a fight to the death, Command & Conquer allows a variety of networking options, complete with separately designed missions for multiplayer games. (Network play works over a standard AppleTalk network, or over a 28.8-Kbps or faster modem link to the Internet.) Even in single-player mode, Command & Conquer offers challenging play and often forces you to make complex tactical decisions beyond simply trying to overpower your opponent.

The Last Word Command & Conquer expands the tactical war-game genre in innovative and exciting ways. It's not as easy to master as competing titles such as Blizzard's Warcraft II (see "1997 Macintosh Game Hall of Fame," January 1997), but if you enjoy real-time strategy games, it's definitely worth adding to your collection.—DANIEL MADAR

RATING: ★★★★/7.8 **PROS:** Excellent variety of weaponry; challenging missions; great team-oriented options. **CONS:** Tiny unit graphics; unwieldy massed troops. **COMPANY:** Westwood Studios (702/228-4040, *http://www.westwood.com*). **LIST PRICE:** $59.99.

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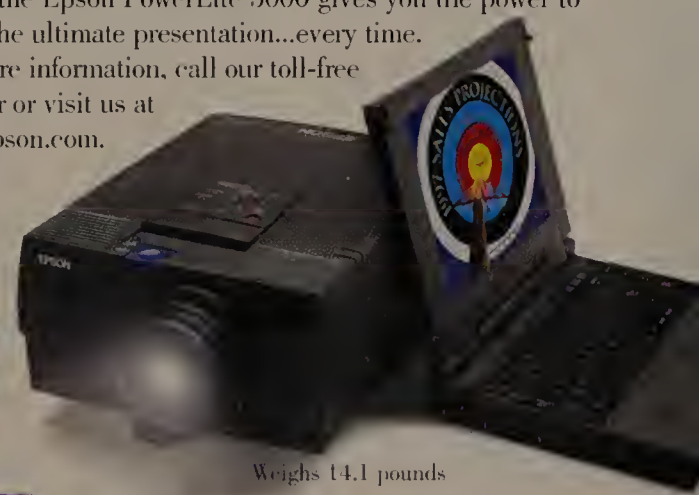

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Software

BUSINESS

★★★★/8.9 **Analytica,** Decisioneering, 303/534-1515, $795. Financial-modeling tool helps assess business decisions. *Mar 97, p. 72*

★★/4.2 **Ascend 4.0,** Franklin Quest, 801/975-1176, $99.95. Information manager isn't competitive with other PIMs. *Apr 97, p. 72*

★★★★/7.9 **Big Business 2.0,** Big Software, 408/725-7200, $199 to $999. All-in-one business application integrates sales, marketing, ordering, and accounting. *Jan 97, p. 64*

★★★★/8.1 **Claris Organizer 2.0,** Claris, 408/727-8227, $69. Solid upgrade is worth the wait. *Jan 97, p. 62*

★★★/5.4 **Day-Timer Organizer 2.1,** Day-Timer Technologies, 415/572-6260, $79.95. All-in-one PIM improved, but not perfect. *Mar 97, p. 72*

★★★★/7.1 **Kiplinger TaxCut '96,** Block Financial, 617/428-1119, $29 to $39. Tax software offers friendly interview process. *Mar 97, p. 56*

★★★★/7.7 **MacInTax Deluxe '96,** Intuit, 520/295-3110, $44.95. CD-ROM includes comprehensive state tax modules. *Mar 97, p. 56*

★★★/6.9 **Mariner Write 1.3,** Mariner Software, 502/222-6695, $69.95. Word processor stresses speed and elegance. *Mar 97, p. 63*

★★★★/8.9 **Personal RecordKeeper 4.0,** Nolo Press, 510/549-1976, $49.95. Database helps keep tabs on personal information. *Mar 97, p. 83*

★★★★/7.6 **PowerBuilder 5.0,** PowerSoft, 508/287-1500, $2995. Key cross-platform database tool puts Mac's SQL skills on par with Unix and NT. *Apr 97, p. 70*

★★★/6.9 **Quicken Business Law Partner 2.0,** Parsons Technology, 319/395-9626, $49. Suffices if you want to get the job done with a minimum of fuss. *Feb 97, p. 84*

★★★★/8.7 **Quicken Deluxe 7.0,** Intuit, 520/295-3220, $59.95. Indispensable financial manager. *Feb 97, p. 64*

★★★★/7.4 **Scripter 2.0,** Main Event Software, 202/298-9595, $199. Easy way to make CGIs work on a Mac-based Web site. *Apr 97, p. 74*

★★★★/7.6 **Small Business Legal Pro Deluxe 2.0,** Nolo Press, 510/549-1976, $59.95. A great value if you want to be fully informed. *Feb 97, p. 84*

★★★/5.1 **TakeNote 1.0,** Academix Software, 415/493-3003, $79.95. Reference tool goes halfway to replacing the familiar index card. *Jan 97, p. 88*

★★★★/7.1 **Timeslips 4.0,** Timeslips, 214/248-9232, $299.95. Time-tracking and -billing package is unnecessarily complex. *Jan 97, p. 86*

GRAPHICS

★★★★/7.1 **Adobe Illustrator 6.0.1,** Adobe Systems, 415/961-4400, $595. Efficient, well-organized drawing program doesn't surpass FreeHand 5.5. *Jan 97, p. 112*

★★★/5.7 **Canvas 5.0,** Deneba, 305/596-5644, $599.95. Midrange graphics program has professional price. *Jan 97, p. 112*

★★/4.8 **Chromatica,** Chroma Graphics, 415/375-1100, $149.95. Handy but limited Photoshop plug-in. *Feb 97, p. 80*

★★/4.6 **CorelDraw 6 Suite,** Corel, 613/728-8200, $595. Graphics suite lacks solid image-editing and drawing programs. *Jan 97, p. 112*

★★★/6.3 **DesignWorkshop 1.5,** Artifice, 541/345-7421, $595. Low-end modeler offers excellent modeling tools. *Apr 97, p. 74*

★★★★/8.9 **Detailer,** Fractal Design, 408/430-4000, $449. Wonderful imaging tool lets you paint directly on 3-D models. *Feb 97, p. 72*

★★★★/7.8 **ElectricImage Broadcast 1.0,** Electric Image, 818/577-1627, $2495. 3-D animation tool gets new price, new features. *Nov 96, p. 88*

★★★★/8.6 **Expression 1.0,** Fractal Design, 408/688-5300, $449. Object-oriented natural-media drawing arrives—at last. *Mar 97, p. 50*

★★★★/8.1 **Extreme 3D 2.0,** Macromedia, 415/252-2000, $399. Great 3-D design program for print, animation, Web, and multimedia. *Apr 97, p. 70*

★★/4.7 **Fastedit/Deluxe,** Total Integration, 847/776-2377, $249. Photoshop plug-in lets you edit quickly. Expensive. *Nov 96, p. 92*

★★★★/8.7 **FreeHand 7,** Macromedia, 415/252-2000, $399. Near-perfect draw program. *Feb 97, p. 56*

★★★★/7.9 **FreeHand Graphics Studio 7,** Macromedia, 415/252-2000, $449. Suite provides professional-level power at an affordable price. *Feb 97, p. 56*

★★★★/8.3 **Full Pixel Search 2.0,** Avian Systems, 201/568-9494, $295. Image-analysis program finds a pixel in a haystack. *Mar 97, p. 84*

★★★★/7.9 **Infini-D 3.5,** Specular, 413/253-3100, $649. Approachable, practical mix of 3-D design tools. *Jan 97, p. 70*

★★★★/8.3 **Kai's Power Goo,** MetaTools, 805/566-6200, $49.95. Family image-editing software that pros will use. *Jan 97, p. 84*

★★★★/8.3 **Photoshop 4.0,** Adobe Systems, 415/961-4400, $895. New version cements image editor's position as the top product. *Feb 97, p. 132*

★★★/5.7 **PhotoTools 1.0,** Extensis, 503/274-2020, $99.95. Useful Photoshop plug-in. *Feb 97, p. 80*

★★★★/8.1 **Poser 2.0,** Fractal Design, 408/430-4100, $249. Human models in 3-D (clothing optional). *Mar 97, p. 76*

continues

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Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

Star Ratings

★★★★/8.2 **PowerCADD 3.0,** Engineered Software, 910/299-4843, $795. Fast, pro-level drafting program is refined. *Jan 97, p. 74*

★★/4.4 **Power/Pac 1,** Auto F/X, 603/875-4400, $249. Useful, but restrictive, Photoshop Macros. *Feb 97, p. 80*

★★★★/8.9 **ScanPrepPro 3.1,** ImageXpress, 770/564-9924, $695. Photoshop plug-in puts image processing on autopilot. *Mar 97, p. 80*

★★★★/8.1 **Slicer 1.0,** Fortner Research, 703/478-0181, $695. View 2-D slices of 3-D images. *Nov 96, p. 98*

★★★/6.5 **Stencil It 1.0,** Kaetron Software, 713/298-1500, $99. Low-cost program is good for charts, but not for art. *Jan 97, p. 72*

★★★★/7.4 **TurboCAD 2D/3D 3.0,** IMSI, 415/257-3000, $149. Nearly high-end CAD program with educational-software price. *Dec 96, p. 61*

INTERNET/NETWORKING

★★★/6.5 **3-D Website Builder,** Virtus, 919/467-9700, $159. VRML authoring program is straightforward but limited. *Feb 97, p. 82*

★★★/6.6 **ActionLine 1.1,** Interactive Media, 415/948-0745, $99. Add pizzazz to Web pages without Java programming. *Apr 97, p. 76*

★★★★/7.7 **Adobe PageMill 2.0,** Adobe Systems, 408/536-6000, $149. WYSIWYG approach to Web design is appealing and efficient. *Feb 97, p. 58*

★★★★/7.2 **Apple Network Administrator's Toolkit,** Apple Computer, 408/996-1010, $599. Suite automates the most important chores of classroom management. *Dec 96, p. 70*

★★★★/7.0 **Bolero,** EveryWare Development, 905/819-1173, $995 to $4995. Best tool for gathering demographics from your Web site; expensive. *Apr 97, p. 68*

★★★★/7.7 **Bookends Web 3.2,** Westing Software, 415/945-3870, $179. Useful, flexible tool for creating bibliographies on the Web. *Dec 96, p. 82*

★★★/6.9 **Claris Home Page 1.0,** Claris, 408/727-8227, $99 (estimated). Home Page leads the pack of HTML editors. *Dec 96, p. 58*

★★★★/7.8 **CyberFinder 2.0,** Aladdin Systems, 408/761-6200, $30. Unobtrusive, small, and incredibly stable URL manager. *Mar 97, p. 58*

★★★★/7.0 **CyberPress 1.0,** Extensis, 503/274-2020, $149. QuarkXPress-to-HTML conversion on a budget. *Mar 97, p. 78*

★★★/6.8 **DigiPhone 1.0,** Third Planet Publishing, 972/733-3005, $39.95. Make low-cost calls over the Internet. *Jan 97, p. 68*

★★★★/7.0 **DragNet 1.1.4,** OnBase Technology, 714/830-5682, $39.95. Good for managing huge URL lists; software is a RAM hog. *Mar 97, p. 58*

★★★★★/9.1 **EtherPeek 3.0,** The AG Group, 510/937-7900, $995. Slew of enhancements will make this network analyzer your right hand. *Dec 96, p. 77*

★★★/5.3 **FileMaker Pro CGI,** Claris, 408/987-7000, free. Slow and inflexible FileMaker Pro Web publishing tool. *Apr 97, p. 114*

★★★★/7.6 **FirstClass 3.5,** SoftArc, 905/415-7000, $495. Easily creates a complete e-mail community. *Mar 97, p. 48*

★★★★/7.5 **Frontier 4.1,** UserLand Software, *http://www.scripting.com/frontier*, free. Fast and powerful scripting environment requires advanced programming knowledge. *Jan 97, p. 152.* **Editors' Choice** for best search tools.

★★/4.1 **Globetrotter 1.1,** Akimbo Systems, 617/776-5500, $99. Web tool avoids HTML but has stability problems. *Apr 97, p. 66*

★★/4.9 **golive Pro 1.1,** gonet communication, 415/463-1580, $99. Attractive HTML editor needs polishing. *Dec 96, p. 58*

★★/4.2 **HoTMetaL Pro 3.0,** SoftQuad, 416/544-9000, $159. Improved Web editor is powerful but still quirky. *Feb 97, p. 58*

★★★/6.8 **HTML Grinder 3.04,** Matterform Media, 505/983-4189, $149. Tools automate site-management chores. *Mar 97, p. 76*

★★★★/7.7 **InterMapper 1.0.1,** Dartmouth College, 603/646-2643, $795. World-class network management. *Jan 97, p. 83*

★★★★/7.3 **Internet Phone 3.0.1,** VocalTec, 201/768-9400, $49.95. Make low-cost calls over the Internet. *Jan 97, p. 68*

★★★★/7.2 **Lasso 1.1,** Blue World Communications, 206/313-1051, $299. Lasso successfully ties FileMaker Pro databases to the Web. *Apr 97, p. 114*

★★★/6.5 **Lasso Lite 1.0.6,** Blue World Communications, 206/313-1051, free. FileMaker Pro Web publishing tool is fast and free. *Apr 97, p. 114*

★★★/6.8 **MacSOUP 2.1,** Stefan Kurth, *stk@kagi.com*, $20. Strong offline e-mail and news reader; that's all it handles, though. *Jan 97, p. 152*

★★★/6.7 **Marionet 1.1.1,** Allegiant Technologies, 619/587-0500, $149. Flexible scripting and search tool for authoring environments, but it requires significant programming knowledge. *Jan 97, p. 152*

★★★★/7.0 **NetCloak 2.1,** Maxum Development, 630/830-1113, $195. Quirky WebStar add-on is a must-buy. *Jan 97, p. 66*

★★★★/8.7 **NetDoubler 1.0,** Asanté, 408/435-8388, $69.95 to $99. Boosts network speeds for large files. *Dec 96, p. 68*

★★★/6.5 **NetForms 2.0,** Maxum Development, 630/830-1113, $195. WebStar add-on fills gaps in server software. *Jan 97, p. 66*

★★★★/7.1 **NewsHopper 1.2,** SW15 Software, *http://www.demon.co.uk/sw15/*, $59. Powerful, scriptable reader, but can't be scheduled and handles only Usenet news. *Jan 97, p. 152*

★★★/6.6 **Now Up-to-Date Web Publisher 1.0,** Now Software, 503/274-2800, $129.95. Publish your calendars and contact lists on the Web. *Dec 96, p. 78*

★★★/6.9 **PageSpinner 1.2.2,** Optima System, *http://www.algonet.se/~optima/pagespinner.htm*, $25. Great tool for creating Web pages—especially for novice users. *Mar 97, p. 54*

★★★/6.9 **Phantom 1.1,** Maxum Development, 708/830-1262, $395. Wonderful Web robot for the Mac is server-friendly, but also expensive and useful primarily for Webmasters. *Jan 97, p. 152*

★★★/6.0 **Quarterdeck Mail 4.0,** StarNine Technologies, 510/649-4949, $395 server; $245, 5-user pack. Cost-effective, all-in-one e-mail solution. *Mar 97, p. 48*

★★★/6.6 **QuickMail Pro 1.0,** CE Software, 515/221-1801, $69.95 to $3449.95. E-mail system has a good basic feature set. *Mar 97, p. 48*

★★/3.6 **QuickSite 1.0,** DeltaPoint, 408/648-4000, $99.95. Clunky interface hobbles potential Web-design powerhouse. *Mar 97, p. 68*

★★★★/7.6 **Retrieve It 2.5,** MVP Solutions, 415/562-3457, $65. Speedy, complex searches of your computer and the Web. *Dec 96, p. 80*

★★★/6.5 **ROFM 4.1,** Russell Owen, *http://rowen.astro.washington.edu*, free. Web publishing freeware with more features, but needs modification. *Apr 97, p. 114*

★★★★/8.0 **Surfboard 1.0,** Abbott Systems, 914/747-3116, $39. Intuitive URL manager looks like a TV's remote control. *Mar 97, p. 58*

★★★★/7.3 **Tango for FileMaker Pro 2.1.1,** EveryWare Development, 905/819-1173, $349. No faster way to Web-enable a FileMaker Pro database. *Apr 97, p. 114*

★★★/6.9 **TCP/IP Scripting Addition,** Mango Tree Software, 617/327-8663, $49. Tool for AppleScript provides access to TCP/IP commands. *Jan 97, p. 152*

★★★★/7.2 **Timbuktu Pro 3.0,** Farallon Communications, 510/814-5000, $139. Network access tool extends its reach. *Jan 97, p. 69*

★★★/5.8 **WebArranger 2.0,** CE Software, 515/221-1801, $79. Powerful bookmark manager handles large quantities of information. *Jan 97, p. 152*

★/2.6 **Web Buddy 1.0,** DataViz, 203/268-0030, $50. Offline Web browser makes it easy to set up a schedule, but is a memory hog. *Jan 97, p. 152*

★★★★/7.0 **Web-FM 3.0,** Web Broadcasting, 415/329-9676, $245. FileMaker Pro Web integration tool is strong and fast but hard to learn. *Apr 97, p. 114*

★★★★/7.2 **Web-Motion 1.0,** Terran Interactive, 408/278-9025, $99.95. Web-savvy plug-in for first-rate compression utility. *Jan 97, p. 81*

★★★★/8.2 **Web Quick 1.2.1,** Europa Software, 503/417-2900, $49.95. Convenient URL manager follows your trail as you browse. *Mar 97, p. 58*

★★★/6.7 **Web Squirrel 1.06,** Eastgate Systems, 617/924-9044, $49. RAM-hungry URL manager is a powerful organizer. *Mar 97, p. 58*

★★★★/7.7 **WebStar 2.0,** StarNine Technologies, 510/649-4949, $795. Web server is better, stronger, faster. *Apr 97, p. 62*

★★/4.4 **WebWhacker 1.0.8,** Forefront Group, 713/961-1101, $70. Clean, simple interface, but offline Web browser lacks scripting and scheduling. *Jan 97, p. 152*

★★★/6.8 **World Wide Web Weaver 2.0.2,** Miracle Software, 315/265-0930, $89. Web-authoring tool is particularly good at editing existing pages. *Mar 97, p. 54*

MEDIA

★★★/6.2 **Acrobat 3.0,** Adobe Systems, 408/536-6000, $295 to $1595. New features still limit use of this portable document program. *Apr 97, p. 52*

★★★★/8.2 **AD-1 Pro Audio Analyzer 2.0,** Intelligent Devices, 410/744-3044, $349 to $449. Audio meters for the discriminating producer. *Dec 96, p. 84*

★★★★/7.1 **Adobe Persuasion 4.0,** Adobe Systems, 408/536-6000, $395. Presentation application makes the leap to the Web. *Mar 97, p. 52*

★★★★/7.5 **Boris Effects 2.0,** Artel Software, 617/566-0870, $350 to $695. Inexpensive, multichannel digital-video-effects program is a worthwhile investment. *Jan 97, p. 76*

★★★/6.8 **ClickWorks 1.0.2,** Pitango, 617/280-7163, $985. Presentation program is a solid choice. *Feb 97, p. 74*

★★★/6.7 **Digital Chisel://HTML 2.1.3,** Pierian Spring Software, 503/222-2044, $109 to $995. Multimedia authoring doesn't make it on the Web. *Jan 97, p. 78*

★★★★/7.4 **Movie Cleaner Pro 1.2.1,** Terran Interactive, 408/278-9025, $189.95. First-rate movie compression utility is a must-have. *Jan 97, p. 81*

★★★★/7.2 **MovieFlo' 2.0.2,** The Valis Group, 415/435-5404, $699. Image-distortion software for pros. *Jan 97, p. 92*

★★★/5.5 **MovieStar 1.5,** Intelligence at Large, 215/387-6002, $149.95. Easy QuickTime moviemaking and animation for the Internet. *Feb 97, p. 92*

★★★/5.4 **MovieTools 1.5,** McQ Productions, 415/348-1344, $195. Simple, precise QuickTime movie processing. *Apr 97, p. 72*

★★★★/7.3 **mTropolis 1.1,** mFactory, 415/548-0600, $1195. Sophisticated authoring environment

continues

Unbelievable Simplicity

Don't be concerned about the resolution, size, horizontality and color correction and mode. Just import images in the Quark image box from a Photo CD disk or from a raw scan. Position them however you want using QuarkXPress's tools. For each, send orders with the processing options to the IPM.

I import my pictures in my QuarkXPress document's image boxes

TIFF, EPS JPEG or Photo CD ImagePac; RGB, YCC, grayscale or CMYK. This image was scanned from a 35 mm original in RGB raw mode at 100% size on a PowerLook 2000 flatbed scanner at its optical resolution of 1000 dpi.

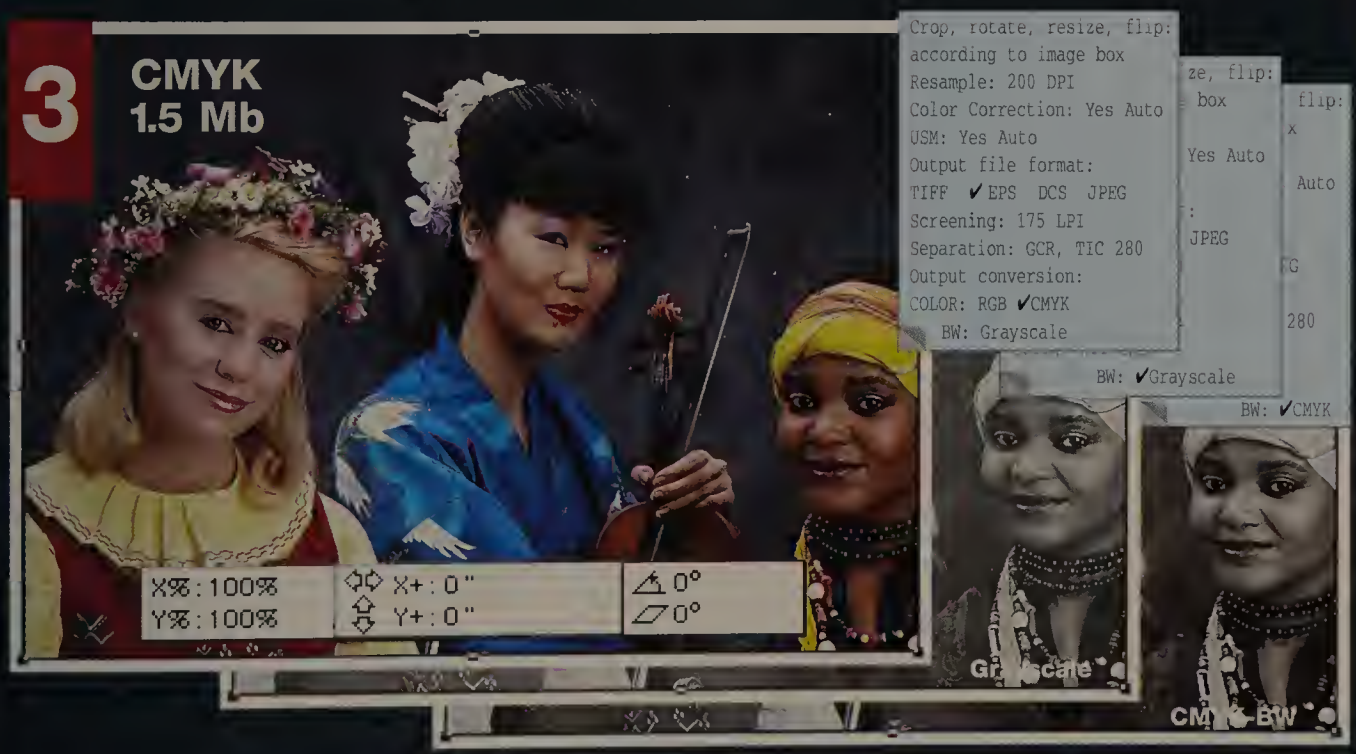
I position them using the XPress tools and I select processing options using the binuscan Xtension

The client XTension writes the "order list" then sends it to the IPM for processing. It includes the values entered in the QuarkXPress "measurement bar" plus the processing and output options set in the XTension's user interface.

Phenomenal Productivity

A catalog with hundreds of images that may require several people a week's worth of work can be processed and ready to output in just a few hours. Processing can take place overnight, even on a low-end desktop computer, with little RAM.

After processing, the new recalculated images are re-imported in the desired color mode with the right amount of pixels... automatically



From a single RGB file, those CMYK, grayscale or CMYK-BW processed images will output at a blazing speed, due to their optimization.

Astonishing Quality

Each processing algorythm uses state-of-the-art technology. Even when the IPM is used only to resize images previously color corrected and separated, the screen preview is recalculated with colors and a sharpness that are truly impressive. No more surprises on the color proof!

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505 5th Avenue - New York, NY. 10017
Tel: (800) 881-2352 - Fax: (212) 681-0603

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http://www.binuscan.com
e-mail: info@binuscan.com

binuscan® ColorPro

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for complete digital image management

Mac OS & Windows 3.11, 95 & NT

THE SERVER APPLICATION

"binuscan IPM®" (Image Processing Machine) works in the background, using the processor only when it's free. It recalculates a new image based on the original and a list of orders generated by a client application. This "order list" contains all the user's output preferences, including (but not limited to) CMYK separation specs, automatic color correction instructions, and sharpening levels, as well as any other modifications made to the image (crop, flip, rotate, resize, etc.) by the client application. binuscan achieves an impressive high and consistent quality every time because the IPM bases its processing algorithms on an individual histogram analysis of every image.

THE CLIENT APPLICATION

Many client applications can be used to generate "order list" text files and save them into the IPM's "TO DO" folder for processing. binuscan's open architecture allows third party developers to write custom client applications. The binuscan ColorPro® package includes the binuscan IPM® plus client applications to acquire images from scanners or Photo CDs and binuscan JobManager® (a Quark XTension) which works as described to the left.

THE PERSONAL TOUCH

binuscan ColorCorrect is a utility included with the IPM which allows you to create ghost effects or "sepia effects" and harmonize the images on your page. This utility will perform color adjustments to processed images by writing PostScript functions to the image file. Modifications are written then updated in your page layout in seconds, no matter how large the files are. Every modification can be reverted with the same ease and in the same manner.

a special version of binuscan is bundled with all UMAX high-end scanners and is freely available for every Kodak Pro Master Photo CD

binuscan® PhotoPerfect

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Star Ratings

is a terrific tool for game developers. *Feb 97, p. 74*

★★★/6.6 **Nisus Writer 5.0,** Nisus Software, 619/481-1477, $249. Renegade word processor is long on innovation, short on basics. *Apr 97, p. 56*

★★★★/7.8 **Pro View 1.3,** E-magine, 800/603-1474, $99.95. Back-to-basics presentation tool. *Nov 96, p. 95*

★★★★/8.0 **QuarkImmedia 1.0,** Quark, 303/894-8888, $995. An easy move from print to multimedia. *Dec 96, p. 57*

★★★★/7.8 **QX-Tools 2.0,** Extensis, 503/274-2020, $99.95. Winning collection of XTensions gets even better. *Mar 97, p. 65*

★★★/6.3 **UniQorn 1.2,** SoftPress Systems, 415/331-4820, $449. Easily turns print into Java-powered Web pages; features still a bit sluggish. *Apr 97, p. 58*

UTILITIES

★★★/6.7 **After Dark 4.0,** Berkeley Systems, 510/540-5535, $30 to $40. Glitzier, but not necessarily better, than previous versions. *Feb 97, p. 76*

★★/4.1 **At Ease 3.0,** Claris, 408/987-7000, $49. Can be easily defeated with a Disk Tools floppy or separate start-up disk. *Nov 96, p. 146*

★★★★/7.5 **Audiotracer 1.0,** Optical Media, 408/376-3511, $99. CD-R mastering program designed for creating audio CDs. *Apr 97, p. 76*

★★★★/7.9 **BorderGuard Access Router,** Network Systems, 612/424-4888, $1700. Transparent encryption of AppleTalk and TCP/IP that lets you use the Internet instead of a private WAN. *Nov 96, p. 146*

★★★/6.0 **Burn It 1.0,** Syncronys Softcorp, 213/340-4100, $29.95. Inexpensive but flawed security suite. *Apr 97, p. 69*

★★★★/7.6 **CanOpener 3.5,** Abbott Systems, 914/747-4171, $65. Reliably recovers text and graphics from damaged files. *Feb 97, p. 88*

★★★/6.2 **cypherPad,** usrEZ Software, 714/756-5140, $49. Easy setup and usage; good basic security. *Nov 96, p. 146*

★★★★/7.3 **DiskGuard 1.5,** ASD Software, 909/624-2594, $79. Good combination of low price and easy installation. Solid, basic protection. *Nov 96, p. 146*

★★★★/7.9 **DiskLock 4.0,** Symantec, 541/984-2490, $129. Automatic setup is easy; has most protection features you need. *Nov 96, p. 146*

★★/4.9 **DiskWorks 3.0.2,** MicroNet Technology, 714/453-6100, $299. Disappointing hard-drive formatter has an awkward interface. *Dec 96, p. 62*

★★★/6.1 **Dr. Solomon's Anti-Virus Toolkit 7.61,** S&S International, 617/273-7400, $85. Antivirus utility checks DOS disks. *Dec 96, p. 60*

★★★/6.0 **Empower 5.0.4,** Magna, 408/879-7907, $129. Decent design, but overpriced. *Nov 96, p. 146*

★/1.8 **Executor 2.0,** Abacus Research & Development, 505/766-9115, $249. Mac emulator for PCs falls far, far short. *Feb 97, p. 78*

★★★★/8.0 **FileGuard 3.0,** ASD Software, 909/624-2594, $139. Most of the features you need, combined with ease of installation, reliable performance, and robust protection. *Nov 96, p. 146.* **Editors' Choice** for best desktop security software.

★★★/6.6 **Font Box 1.8.3,** Insider Software, 619/622-9900, $79.95 to $169.95. Font fixer needs some repairs. *Nov 96, p. 90*

★★/4.9 **FoolProof 2.5,** SmartStuff Software, 503/231-4300, $39. Decent design, but lacks features and is too easy to defeat. *Nov 96, p. 146*

★★★★/7.0 **Hard Disk ToolKit 2.0.1,** FWB, 415/463-3500, $199. Reliable hard-drive formatter can actually tweak a drive to run faster. *Dec 96, p. 62*

★★★/6.8 **KeyQuencer 2.0,** Binary Software, 310/449-1481, $39.95 direct. Macro program for speed addicts and control freaks. *Dec 96, p. 59*

★★★★/7.8 **KeyServer 4.1,** Sassafras Software, 603/643-3351, $800. Easy-to-install tool enforces usage thresholds and lets you track applications. *Nov 96, p. 146*

★★★★/8.3 **Mac Manager 3.1,** ELS, 352/375-0558, $299. Provides both safe and impenetrable access protection and data encryption. *Nov 96, p. 146*

★★★★/7.5 **MATLAB Statistics Toolbox 2.0,** The MathWorks, 508/647-7000, $395. Statistical analysis tool on steroids. *Dec 96, p. 77*

★★★★★/9.3 **MATLAB Wavelet Toolbox 1.0,** The MathWorks, 508/647-7000, $895. Powerful wavelet-analysis tool. *Dec 96, p. 77*

★★★★/7.7 **McAfee VirusScan 2.0,** McAfee Associates, 408/988-3832, $65. World-class virus protection has little impact on Mac's performance. *Dec 96, p. 60*

★★★★/8.1 **NetShade 1.1,** Atemi, 217/352-3689, $299. Easy to install and configure, it scrambles data and foils all but the most determined sniffers. *Nov 96, p. 146*

★★★★/8.1 **Network Security Guard 3.1,** Mr. Mac Software, 619/453-2845, $289. Scans your network for unintentional guest access, poorly chosen passwords, and other security loopholes. *Nov 96, p. 146*

★★★/6.4 **Now Utilities 6.5,** Now Software, 503/274-2810, $89.95. Incremental feature upgrades are no substitute for stability. *Mar 97, p. 74*

★★★★/7.1 **On Guard 2.1,** Power On Software, 216/735-3116, $70. Easy install, attractive Finder-like configuration menu; low-priced. *Nov 96, p. 146*

★★★★/8.2 **QuicKeys 3.5,** CE Software, 515/224-1995, $119. QuicKeys exists to make macros easier. *Dec 96, p. 59*

★★★★/8.6 **RAM Doubler 2.0,** Connectix, 415/571-5100, $99. Control panel now triples your RAM. *Dec 96, p. 67*

★★★/6.4 **SAM 4.5,** Symantec, 408/253-9600, $69.95. Industrial-strength virus protection. *Feb 97, p. 86*

★★★/6.1 **SecretAgent 3.0,** AT&T, 847/405-0390, $249. Overpriced one-trick pony; is cross-platform compatible. *Nov 96, p. 146*

★★★★/7.8 **Spell Catcher 1.5.6,** Casady & Greene, 408/484-9228, $59.95. Resurrected Thunder 7 is still much more than a spelling checker. *Dec 96, p. 73*

★★/4.0 **Startup Manager 7.0,** Now Software, 503/274-2810, $55. Extension-management tool simply can't compare to the competition. *Mar 97, p. 61*

★/2.7 **StellarFax 1.1,** TechPool, 216/291-1922, $249. Sends inferior-quality faxes faster. *Feb 97, p. 90*

★★/4.6 **Turbo Toolkit 1.0,** FWB Software, 415/463-3500, $79. Disk utility offers minor speed-up. *Mar 97, p. 74*

★★★★/7.0 **ultraSecure,** usrEZ Software, 714/756-5140, $239. A textbook of required security features, hampered by so-so manual and complex installation. *Nov 96, p. 146*

★★★/6.4 **ultraShield,** usrEZ Software, 714/756-5140, $149. Mixed combination of terrific features with complex installation and multiple warnings about use with other software. *Nov 96, p. 146*

★★/4.3 **UnderCover,** SmartStuff Software, 503/231-4300, $39. A slightly buggy one-trick pony. *Nov 96, p. 146*

★/2.1 **ViaCrypt PGP 4.0,** ViaCrypt, 602/944-0773, $129. Hard to install, hard to use; few saving graces. *Nov 96, p. 146*

★★★/6.9 **Virex 5.6.7,** Datawatch, 508/988-7000, $100. Fast scanning, but caused general system slowdown. *Nov 96, p. 146*

★★★★/7.0 **WebLock 1.0,** Maxum Development, 708/830-1113, $195. Gives your Web server access protection via password log-in to protect private pages. *Nov 96, p. 146*

★★★★/8.5 **WebStar SSL 1.2.4,** Quarterdeck, 310/309-3700, $1295. Lets you use transparent encryption to exchange sensitive data safely with security socket layer-capable Web browsers. *Nov 96, p. 146.* **Editors' Choice** for best network security.

★★★/6.5 **Working Papers,** Dominion Software, 617/332-1144, $199.95. Manage your documents with OCR program and document organizer. *Feb 97, p. 94*

Hardware

DIGITAL CAMERAS

★★/3.9 **Casio QV-100,** Casio, 201/361-5400, $599. Camera produces poor-quality images with blown highlights. *Mar 97, p. 112*

★★★/5.8 **Casio QV-10A,** Casio, 201/361-5400, $399. Blown highlights and color cast problems mar images from camera. *Mar 97, p. 112*

★★★/6.6 **D-200L,** Olympus Image Systems, 516/844-5000, $599. Digital camera offers good image quality and a built-in flash. *Mar 97, p. 112*

★★/4.6 **DC20,** Kodak, 716/724-4000, $350. Pint-size camera contains no extras whatsoever. *Mar 97, p. 112*

★★★/6.8 **DC50,** Kodak, 716/724-4000, $979. Good color, expandability, and an excellent zoom lens set the DC50 apart. *Mar 97, p. 112*

★★★/6.0 **Epson PhotoPC,** Epson, 310/782-0770, $499. Digital camera's viewfinder doesn't show the whole image. *Mar 97, p. 112*

★★★★/7.1 **Fuji DS-7,** Fuji Photo Film, 914/789-8100, $699. Camera makes framing and reviewing photographs child's play. *Mar 97, p. 112.* **Editors' Choice** for best entry-level digital cameras.

★★★★/7.9 **PDC-2000-40,** Polaroid, 716/256-4436, $3695. Digital camera is difficult to use and costly but produces extremely high-quality images. *Mar 97, p. 112.* **Editors' Choice** for best entry-level digital cameras.

★★★/6.2 **QuickTake 150,** Apple Computer, 408/996-1010, $739. Oversize camera quickly downloads images. *Mar 97, p. 112*

★★★/5.8 **RDC-2,** Ricoh, 702/352-1600, $999. Fair-to-middling image quality detracts from this camera's extras. *Mar 97, p. 112*

INPUT DEVICES

★★★★/8.9 **3M Precise Mousing Surface,** 3M, 612/733-1110, $15. Throw out your neoprene pad and treat your mouse to a deluxe surface. *Jan 97, p. 56*

★★★/5.2 **GlidePoint Keyboard,** Alps Electric, 408/432-6000, $139.95. Keyboard offers full set of keys with intuitive touchpad. *Apr 97, p. 60*

★★★/5.5 **Stingray 4.0,** CoStar, 203/661-9700, $55. Trackball offers flexible design but limited programmability. *Feb 97, p. 70*

★★★/5.9 **TrackBoard and NumPad,** Datadesk, 206/842-5480, $99.95 to $139.95. Keyboard has a separate numeric keypad but only a small trackball. *Apr 97, p. 60*

★★★/5.2 **TrackMan Marble,** Logitech, 510/795-8500, $99. Restrictive design and unimpressive software. *Feb 97, p. 70*

★★★★/8.5 **Turbo Mouse 5.0,** Kensington, 415/572-2700, $110. MouseWorks software makes programmable trackball a standout. *Feb 97, p. 70*

continues

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Star Ratings

MISCELLANEOUS HARDWARE

★★★/6.6 **8 Plex,** Plextor, 408/980-1838, $539. Uses its own mechanism, and FWB driver software, but costs more than other bundles. *Dec 96, p. 145*

★★★★/7.1 **8× External CD-ROM Drive for Mac,** La Cie, 503/520-9000, $199 (estimated). Price/performance leader with well-implemented audio software. *Dec 96, p. 145.* **Editors' Choice** for best CD-ROM drive.

★★★/5.8 **Advantage 8× External CD-ROM,** Micro-Net Technology, 714/453-6000, $249 (estimated). Performed well in our tests, but lacks a power-on light and external audio-control buttons. *Dec 96, p. 145*

★★★★/8.2 **AirCommunicator Lite,** Air Communications, 408/567-8000, $695. Cellular fax modem with flair offers a complete solution. *Nov 96, p. 79*

★★★★/8.5 **AlphaSmart Pro 2.1,** Intelligent Peripheral Devices, 408/252-9400, $269. Intelligent keyboard works as stand-alone input device. *Mar 97, p. 82*

★★★★/7.0 **Apex,** Pinnacle Micro, 714/789-3000, $1995. King-size magneto-optical drive offers respectable speeds. *Apr 97, p. 54*

★★★/6.9 **CDS658PSD,** Dynatek, 902/832-3000, $349. Nicely designed; offers speedy performance and superior driver software. *Dec 96, p. 145*

★★★★/7.5 **DynaTek CDM 4001,** DynaTek Automation Systems, 902/832-3000, $2889. Hard drive/CD-R combo unit simplifies CD-ROM mastering. *Mar 97, p. 78*

★★★★/8.8 **MicroWorks,** Cambridge SoundWorks, 617/332-5936, $349. Competitively priced speaker system has great sound. *Dec 96, p. 66*

★★/3.1 **Midi Land S35/818 Systems,** Midi Land, 909/592-1168, 818 desktop speaker $79.95, S35 subwoofer $239.95. Speaker system has mediocre sound quality. *Nov 96, p. 72*

★★★/6.0 **NovaModem 288 1.0,** NovaLink Technologies, 510/249-9777, $229. Decent performance from PowerBook PC Card modem. *Nov 96, p. 94*

★★/4.8 **PCA80SC,** Philips Electronics, 408/773-1304, $299. Disappointing performance, though excellent audio software. *Dec 96, p. 145*

★★★★/7.8 **Pilot,** Palm Computing, 415/237-6000, $249 to $299. Pocket PDA is small, swift, and sweet. *Apr 97, p. 48*

★★★★/7.8 **Sagem Planet ISDN GeoPort Adapter,** Sagem, 408/446-8693, $395. ISDN terminal adapter breaks serial port speed barrier. *Mar 97, p. 66*

★★★/5.5 **SCSI Express CD37,** Micro Design International, 407/677-8333, $505. Although slightly slower than the 8× drives, this 6.7× drive offered a sturdy design and well-designed driver software. *Dec 96, p. 145*

★★★★/7.6 **SoundWorks,** Cambridge SoundWorks, 617/332-5936, $219.95. High-quality audio product at an affordable price. *Dec 96, p. 66*

★★★★/7.0 **Supra Simple Internet 33.6 1.0,** Diamond Multimedia, 360/604-1400, $159.95. Modem makes Internet access quick and easy. *Jan 97, p. 90*

★★★/6.9 **Viewpoint Model 100,** Lightware, 503/641-7873, $5795. Much light, some sound in a surprisingly small projector. *Nov 96, p. 85*

★★★/6.4 **WebRamp,** Trancell Systems, 408/988-5353, $899. ISDN router is easy to use, but missing some features. *Mar 97, p. 70*

★★★★/7.1 **Yamaha System 45,** Yamaha, 714/522-9240, $249.95. Speakers give you decent sound at a decent price. *Nov 96, p. 72*

MODEMS/NETWORKS

★★★★/8.8 **4-Sight Fax 4.0,** 4-Sight Technologies, 515/221-3000, $795 for 10 users. Flexible, reliable faxing on your network. *Apr 97, p. 57*

★★/4.8 **MultiModemZDXV,** Multi-Tech Systems, 612/785-3500, $269. Expensive average-performing 33.6-Kbps modem, no Mac software. *Apr 97, p. 123*

★★★/5.3 **MV.34MA,** Boca Research, 561/997-6227, $236. Cheap 33.6-Kbps modem offers fast, easy internet hookup. *Apr 97, p. 123*

★★★/6.6 **Quicktel II-C 33X-ASP-C-M,** Logicode Technology, 805/383-2500, $319. Fast 33.6-Kbps modem with innovative design, but a bit expensive. *Apr 97, p. 123*

★★/4.5 **SmartLink 3334AV,** Archtek America, 818/912-9800, $209. Poorly performing, reasonably priced 33.6-Kbps modem. *Apr 97, p. 123*

★/2.7 **SmartOne 336FLXMac,** Best Data Products, 818/773-9600, $179. Inexpensive 33.6-Kbps modem is one of the slowest. *Apr 97, p. 123*

★★★★/7.1 **Sportster 28.8/33.6 Faxmodem,** U.S. Robotics, 847/676-7010, $179 (estimated). Affordable 33.6-Kbps modem offers best performance. *Apr 97, p. 123.* **Editors' Choice** for best 33.6-Kbps fax modem.

★★★/6.7 **SupraSonic 336V+,** Diamond Multimedia Systems, 360/604-1400, $249 (estimated). Full-featured 33.6-Kbps modem isn't cheap but is really fast. *Apr 97, p. 123*

★★★/6.5 **TelePort Internet Edition 33.6,** Global Village Communication, 408/523-1000, $169 (estimated). Fast 33.6-Kbps modem includes flash ROM and CCL scripts. *Apr 97, p. 123*

★★/4.9 **Zoom V.34X Plus,** Zoom Telephonics, 617/423-1072, $199. Average-performing 33.6-Kbps modem with a long, seven-year warranty. *Apr 97, p. 123*

PRINTERS

★★★/6.9 **Apple Color StyleWriter 1500,** Apple Computer, 408/996-1010, $249. Lackluster performance and image quality mark this color ink-jet. *Feb 97, p. 140*

★★★★/7.5 **Apple Color StyleWriter 2500,** Apple Computer, 408/996-1010, $349. Relatively fast color ink-jet has fair image quality. *Feb 97, p. 140*

★★★★/7.3 **BJC-4550,** Canon Computer Systems, 714/438-3000, $499. Ink-jet produces beautiful images with optional photo ink kit. *Feb 97, p. 140*

★★★/6.5 **Canon CLBP 360PS,** Canon USA, 516/328-5000, $12,500. Color laser printer had good text output, but other tests were mediocre. *Nov 96, p. 157*

★★★/6.7 **Color LaserWriter 12/600 PS,** Apple Computer, 408/996-1010, $6989 (estimated). Slow speed but excellent text output. *Nov 96, p. 157*

★★★★/7.8 **DeskJet 870Cse,** Hewlett-Packard, 408/246-4300, $499. Outstanding color ink-jet for inexpensive office printing. *Feb 97, p. 140*

★★★/6.9 **DeskJet 1600CM,** Hewlett-Packard, 408/246-4300, $1999. Expensive ink-jet printer offers good speed and crisp text. *Feb 97, p. 140*

★★★/5.9 **DeskWriter 600,** Hewlett-Packard, 408/246-4300, $199. Decent speed and average print quality at a nice price. *Feb 97, p. 140*

★★★★/7.2 **DeskWriter 680c,** Hewlett-Packard, 408/246-4300, $279. Color ink-jet offers above-average image quality. *Feb 97, p. 140*

★★★/5.1 **HP Color LaserJet 5M,** Hewlett-Packard, 408/246-4300, $9195. Inferior output; slow; messy consumables. *Nov 96, p. 157*

★★★/6.6 **magicolor CX/32,** QMS, 334/633-4300, $7999. Unexceptional output for this color laser printer. *Nov 96, p. 157*

★★★/5.4 **MD-2010,** Alps Electric, 408/432-6000, $499. Low-end color printer is slow, with poor-quality output. *Feb 97, p. 140*

★★★★/7.0 **Optra C,** Lexmark International, 606/232-2000, $6849. This color laser printer has easy-to-use controls; good text and graphics output. *Nov 96, p. 157*

★★★★/7.9 **Phaser 350,** Tektronix, 503/682-7377, $3495. Solid-ink printer delivers laser-quality output. *Nov 96, p. 67*

★★★★/7.6 **Phaser 550,** Tektronix, 503/685-3067, $6995. Fastest color laser printer tested; superior output; true 1200-dpi resolution. *Nov 96, p. 157.* **Editors' Choice** for best color laser printers.

★★★★/7.8 **Stylus Color 500,** Epson America, 310/782-0770, $279. Good price, output, and speed, but this color ink-jet is messy. *Feb 97, p. 140*

★★★/5.7 **TruPhoto,** Panasonic Interactive Media, 408/653-1888, $479.95. Digital photo printer offers instant snapshots, delayed gratification. *Apr 97, p. 64*

★★★★/7.2 **XPrint 4915 Plus,** Xerox, 716/442-4028, $4995. Top-notch graphic output; a great color laser printer value. *Nov 96, p. 157.* **Editors' Choice** for best color laser printer.

★★★/6.9 **XPrint 4925 Plus,** Xerox, 716/442-4028, $8995. Color laser printer's graphics results among the best; unimpressive speed. *Nov 96, p. 157*

SCANNERS

★★★★/7.5 **Agfa StudioStar,** Agfa, 508/658-5600, $989. Graphics pros will treasure scanner's high-quality scans and powerful software. *Feb 97, p. 62*

★★/4.8 **Apple Color OneScanner 1200/30,** Apple Computer, 408/996-1010, $799. A big disappointment; offers little advantage over its lower-priced predecessor. *Feb 97, p. 62*

★★/3.7 **ArtiScan Z1-600,** Tamarack Technologies, 714/744-3979, $499. Slow, unimpressive machine makes a rumbling noise while scanning. *Mar 97, p. 131*

★★/3.3 **ArtiScan Z1-1200,** Tamarack Technologies, 714/744-3979, $699. Slow, unimpressive, noisy scanner can scan at 600 dpi and 30-bit. *Mar 97, p. 131*

★★★/5.1 **Color OneScanner 600/27,** Apple Computer, 408/996-1010, $549 (estimated). Sleek and compact, but can't compete with less-expensive models. *Mar 97, p. 131*

★★★★/8.4 **Epson Expression 636,** Epson America, 800/922-8911, $899 as tested. Low-cost color scanner gets the nod for all-around use. *Feb 97, p. 62*

★★/4.9 **HP ScanJet 5p,** Hewlett-Packard, 800/722-6538, $530. Attractive scanner marred by mediocre image quality and software. *Apr 97, p. 50*

★★/3.8 **ImageReader Elite,** Info, 408/538-2500, $399. Small, inexpensive scanner delivers mediocre performance. *Mar 97, p. 131*

★★/3.8 **ImageReader FB,** Info, 408/538-2500, $549. Painfully slow scanner with anemic software and awkward case design. *Mar 97, p. 131*

★★/3.8 **ScanAce II,** PacificImage Electronics, 310/214-5281, $899. Bulky scanner performed well in color, gray-scale, and resolution tests. *Mar 97, p. 131*

★★/4.9 **ScanJet 4P,** Hewlett-Packard, 208/323/2551, $615. Outstanding color fidelity, but large, heavy scanner has weak software. *Mar 97, p. 131*

★★/3.8 **ScanMaker E3,** Microtek Lab, 310/297-5000, $329 (estimated). Inexpensive, but disappointing speed, color, and gray-scale test results. *Mar 97, p. 131*

★★/3.7 **ScanMaker E6,** Microtek Lab, 310/297-5000, $599. 30-bit color, but otherwise no better than the ScanMaker E3. *Mar 97, p. 131*

★★★/5.9 **ScanTouch 110,** Nikon Electronic Imaging, 516/547-4355, $299 (estimated). A relatively fast scanner, with good color fidelity and an attractive price. *Mar 97, p. 131*

continues

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Star Ratings

★★★/5.3 **ScanTouch 210,** Nikon Electronic Imaging, 516/547-4355, $699 (estimated). Slower and more expensive than the ScanTouch 110, but 600 dpi. *Mar 97, p. 131*

★★★★/7.1 **SilverScanner Pro,** La Cie, 503/520-9000, $499. Great low-cost scanner with compact design, and good software. *Mar 97, p. 131.* **Editors' Choice** for best low-end scanners.

★★★/6.9 **SnapScan,** Agfa, 508/658-5600, $389 (estimated). Quiet, fast scanner has good scanning software. *Mar 97, p. 131*

★★★★/8.4 **Vista-S6E,** Umax Technologies, 510/651-4000, $345 (estimated). Inexpensive scanner did well on most tests; good software. *Mar 97, p. 131.* **Editors' Choice** for best low-end scanners.

★★★/6.6 **Vista-S12E,** Umax Technologies, 510/651-4000, $649. Fast, with minimal image noise, but the Vista S-6E is a better choice. *Mar 97, p. 131*

VIDEO/DISPLAY

★★★/6.3 **Diamond Pro 91TXM,** Mitsubishi Electronics America, 714/220-2500, $1699. Pricey for an average product, with below-average image quality. *Jan 97, p. 125*

★★★/6.1 **G200,** IBM, 914/766-1900, $1469. Easy to use, but below-average image quality. *Jan 97, p. 125*

★★★★/7.6 **G810,** ViewSonic, 909/869-7976, $1595. A great price for a top pick in both usability and image quality. *Jan 97, p. 125.* **Editors' Choice** for best two-page monitors.

★★★/6.7 **Multigraph 445Xi,** Nokia Display Products, 415/331-4244, $1899. A little pricey for a monitor with medium image quality. *Jan 97, p. 125*

★★★/6.7 **Multiple Scan 20,** Apple Computer, 408/996-1010, $2149. Good overall image quality, but pricey for its category. *Jan 97, p. 125*

★★★/6.6 **MX21F-M,** Mag InnoVision, 714/751-2008, $1699. Average price for average usability and image-quality scores. *Jan 97, p. 125*

★★/4.7 **P201,** IBM, 914/766-1900, $2635. Poor image quality and hard to use. *Jan 97, p. 125*

★★★/6.2 **PanaSync S21,** Panasonic, 201/348-7000, $1899. Good controls, but a little expensive for below-average image quality. *Jan 97, p. 125*

★★★/5.8 **PrecisionView 21,** Radius, 408/541-6100, $2749. Overpriced for only average test scores and a one-year warranty. *Jan 97, p. 125*

★★★/6.9 **Pro P810,** ViewSonic, 909/869-7976, $1745. Superb image quality, but costlier than its sibling, the G810. *Jan 97, p. 125*

★★★★/7.4 **RasterOps SuperScan Mc20,** Hitachi NSA, 617/461-8300, $1599. Good bargain for an overall good performer. *Jan 97, p. 125*

★★★/6.6 **RasterOps SuperScan Mc801HR,** Hitachi NSA, 617/461-8300, $2199. A bit costly for only above-average image quality, mediocre controls. *Jan 97, p. 125*

★★★/6.4 **SyncMaster 21 GLs,** Samsung Electronic America, 201/971-0400, $1959. Expensive unit for overall average performance. *Jan 97, p. 125*

★★★/5.6 **Ultra 20-M,** Princeton Graphic Systems, 714/751-8405, $1249. Inexpensive, but you get what you pay for—not high quality. *Jan 97, p. 125*

★★★/6.4 **VisionMaster 21,** Iiyama North America, 215/957-6543, $1945. Overall, a good unit, but not good enough to justify the price. *Jan 97, p. 125*

★★★★/8.3 **VisionMaster Pro 21,** Iiyama North America, 215/957-6543, $1995. Top overall image quality with clear on-screen controls. *Jan 97, p. 125.* **Editors' Choice** for best two-page monitors. m

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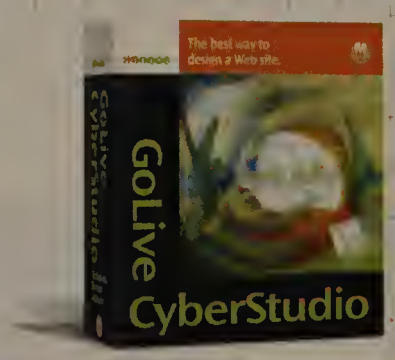

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Mac Superguide

MACWORLD SELECTS THE BEST MAC OS SYSTEMS

Looking for a new Macintosh but confused about which of all the new models to buy? Look no further. Each month, the *Mac Superguide* section provides *Macworld*'s picks for the best Mac OS systems. Typically we recommend three top choices: an Editors' Choice winner and two runners-up. Occasionally we'll have more or fewer top choices in categories with unusually competitive—or uncompetitive—options.

You'll also find *Macworld* Star Ratings and Macworld Lab performance benchmarks for all Mac OS systems shipping as we went to press in late February 1997. You may read about other Mac models in *Macworld* and elsewhere, but those are prototypes not yet available—the only systems rated here are those you can actually buy.

For Mac systems reviewed earlier, the summaries below include the issue date and page number of the article. In some cases, such as faster versions of existing Macs, there is no full review and thus no cross-reference. New systems are indicated in the benchmark by the ▶ icon.

Star Ratings and Editors' Choice designations may have changed since previous issues, based on the current lineup of systems and any price changes; the winners listed here are the current ones.

Prices from Apple, Motorola, and Umax are company-estimated street prices; actual price may vary from the company estimates. APS, DayStar, Power Computing, and PowerTools sell direct, so the prices listed here are the ones you would actually pay. Unless otherwise noted, all systems include a keyboard and mouse, but not a monitor or modem. DayStar systems do not include a hard drive, RAM, keyboard, or mouse, although we add their cost in determining the prices reported here.

For price comparisons, figure on spending about $800 for a 17-inch monitor and, if they're needed, $175 for a modem, $100 for an extended keyboard, $50 for a mouse, $400 for a 2GB hard drive, $175 for 2MB of VRAM, and $100 for 16MB of RAM.

OFFICE SYSTEM

EDITORS' CHOICE

★★★★/7.4 **Power Macintosh 7300/180** The new desktop system from Apple finally does it right: strong performance, competitive price, easy expansion, and no unneeded extras. It's nice to see Apple has learned the lessons about value that the clone competition has been trying to teach. Apple Computer (408/996-1010): $2399, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 12× CD, 1 free drive bay, 3 PCI slots. *May 97, p. 100*

★★★★/7.1 **SuperMac J700/180** Similar to Apple's Power Mac 7300/180, the J700/180 distinguishes itself by offering one more PCI slot and one more free drive bay, plus it has more cache than the 7300. But it costs more than and is not as fast as the 7300. Umax Computer (510/226-6886): $2499, 16MB RAM, 512K cache, 2MB VRAM (4MB maximum), 2.1GB hard drive, 6.7× CD, 2 free drive bays, 4 PCI slots. *May 97, p. 100*

★★★★/7.0 **PowerCenter 150** A great price, plus more expansion than Apple's Power Mac 7300/180, make the PowerCenter 150 tower the ideal general-purpose office Mac for people on a budget. Power Computing (512/388-6868): $1795, 16MB RAM, 512K cache, 2MB VRAM (4MB maximum), 1.0GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. A desktop version with no free drive bays costs $1695. *May 97, p. 100*

The PowerBase 200 offers a compelling price, good features, and solid performance for home offices.

PORTABLE SYSTEM

EDITORS' CHOICE

★★★★/7.6 **PowerBook 3400c/200** Finally, Apple has a notebook Mac that's worthy of an Editors' Choice recommendation. The new 3400c/200 is almost twice as fast as a top-of-the-line Pentium notebook yet costs just $500 more. A built-in modem and Ethernet port mean you don't need to get an expensive PC Card modem/Ethernet combo. However, the 3400c is not perfect: it does not support multiple monitors and its CPU is not upgradable. And, of course, the high price puts the 3400c out of reach for many people. Apple Computer (408/996-1010): $5495, 32MB RAM, 2.0GB hard drive, 6× CD, 12.1-inch active matrix LCD, 1 drive bay, 2 PC Card slots. *May 97, p. 50*

★★★/6.4 **PowerBook 1400cs/117** Apple's midrange notebook accommodates an optional CD-ROM drive. The result is a better system than the old 5300 series, but no barn burner. The large LCD screen is nice, even though it's passive matrix. Apple Computer (408/996-1010): $2495, 12MB RAM, 750MB hard drive, optional 6× CD, 11.3-inch passive-matrix LCD, 1 drive bay, 2 PC Card slots ($3500 model 1400c/117 has active-matrix LCD and 1.0GB hard drive). *Jan 97, p. 58*

SMALL-OFFICE/HOME-OFFICE SYSTEM

EDITORS' CHOICE

★★★★/7.4 **PowerBase 200** Pro-level performance for a price less than that of Apple's Performa 6400/200, plus a strong selection of features and greater expansion capability, make this tower system a great buy for consultants and small businesses. Power Computing (512/388-6868): $1495, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 1.2GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. *May 97, p. 100*

Schools will like the Apple Power Mac 5400/180, thanks to its all-in-one design and decent speed.

★★★★/7.1 **Performa 6400/200** Good performance contrasts with limited internal expansion. But a good price makes this tower attractive. A unique feature is its TV tuner slot. Apple Computer (408/996-1010): $1799, 16MB RAM, 256K cache, 1MB VRAM (1MB maximum), 2.4GB drive, 8× CD, 1 free drive bay, two 7-inch PCI slots, TV/FM tuner slot, 28.8-Kbps modem. *May 97, p. 100*

EDUCATION SYSTEM

EDITORS' CHOICE

★★★★/7.4 **PowerBase 180** Strong performance, low price, good expandability, and features such as 3-D video acceleration make this tower a great buy for cash-strapped schools and students. Power Computing (512/388-6868): $1295, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 1.2GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. *May 97, p. 100*

EDITORS' CHOICE

★★★★/7.1 **Power Macintosh 5400/180** This all-in-one Mac—available only to schools—eliminates the need for cables that could get damaged or stolen in a school. Rich in features—including a

PHOTOGRAPHS BY KEVIN CANDLAND

REAL PRODUCTS REAL RATINGS Reviews you can trust: Unlike other publications, Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy.
Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

good monitor—and moderate in speed, the 5400 is a good classroom Mac. Apple Computer (408/996-1010): $1999, 16MB RAM, 1MB VRAM (1MB maximum), 1.6GB hard drive, 4× CD, no free drive bays, 7-inch PCI slot, TV/FM tuner slot, Ethernet card, internal stereo speakers, monitor included. *May 97, p. 100*

IMAGE-EDITING AND 3-D GRAPHICS SYSTEM

EDITORS' CHOICE

★★★★/8.2 **PowerTower Pro 225** This expandable tower offers the top performance needed for all-around image-editing and 3-D graphics work. Although a multiprocessor-based Mac is faster for certain key operations, the PowerTower Pro 225 is faster for overall tasks, and cheaper as well. Power Computing (512/388-6868): $3695, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 8× CD, 6 free drive bays, 6 PCI slots. *Dec 96, p. 120*

EDITORS' CHOICE

★★★★/7.5 **Genesis LT 400+** The new LT 400+ shines in performance for multiprocessor (MP)–enabled programs and comes at a good price. Photoshop users who use MP-accelerated filters such as Gaussian blurs all day will love it. DayStar Digital (770/967-2077): $5499, 16MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 2 free drive bays, 6 PCI slots.

★★★★/7.4 **Genesis MP 720+** The ultimate Mac system speeds through multiprocessor (MP)–enabled programs such as Adobe Photoshop and Strata Studio Pro Blitz. The oversize tower leaves room for everything you might need. DayStar Digital (770/967-2077): $10,714, 16MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 7 free drive bays, 6 PCI slots. *Dec 96, p. 120*

PUBLISHING AND DESIGN SYSTEM

EDITORS' CHOICE

★★★★/8.2 **PowerTower Pro 225** The fastest single-CPU Mac offers the top performance needed for publishing pros—and it does so at an incredibly low price. Power Computing (512/388-6868): $3695, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 8× CD, 6 free drive bays, 6 PCI slots. *Dec 96, p. 120*

EDITORS' CHOICE

★★★★/8.0 **SuperMac S900/225** Nearly as fast as Power Computing's slightly cheaper PowerTower Pro 225, but with fewer free drive bays, the SuperMac S900/225 is a solid second choice for an easily expandable system. Umax Computer (510/226-6886): $3899, 32MB RAM, 512K cache, 8MB VRAM (8MB maximum), 2.1GB hard drive, 8× CD, 4 free drive bays, 6 PCI slots. *Dec 96, p. 120*

Umax's SuperMac S900/225 makes a fine system for professional publishers and designers.

★★★★/7.9 **PowerTower Pro 200** This Mac offers the high performance needed for publishing pros. And for $1000 less than a comparably equipped PowerTower Pro 225, it's a much better price/performance deal. Power Computing (512/388-6868): $2695, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 8× CD, 6 free drive bays, 6 PCI slots. *Dec 96, p. 120*

MULTIMEDIA AND VIDEO CREATION SYSTEM

EDITORS' CHOICE

★★★★/7.4 **Genesis MP 720+** The ultimate Mac speeds through multiprocessor (MP)–enabled programs such as Adobe Premiere and After Effects. Its oversize tower case lets you add a huge number of drives. DayStar Digital (770/967-2077): $10,714, 16MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 7 free drive bays, 6 PCI slots. *Dec 96, p. 120*

WEB AND INTRANET SERVER SYSTEM

EDITORS' CHOICE

★★★★/8.0 **PowerTower Pro 200** The second-fastest single-CPU Mac offers the high performance needed for Web serving at a very attractive price. Power Computing (512/388-6868): $2695, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 8× CD, 6 free drive bays, 6 PCI slots. *Dec 96, p. 120*

★★★★/7.8 **SuperMac S900/200** Speed and expansion make this a good departmental or Web server. Umax Computer (510/226-6886): $3399, 32MB RAM, 512K cache, 8MB VRAM (8MB maximum), 2.1GB hard drive, 8× CD, 4 free drive bays, 6 PCI slots. *Dec 96, p. 120* m

Macworld LAB TEST

Every Mac Tested and Rated

▶ New this issue. Editors' Choice winners in red. Longer bars are better. Core results are times as fast as a Centris 650 (Centris 650 = 1.0). Multiprocessor results are times as fast as a Power Mac 9500/150 (9500 = 1.0). Only shipping systems are tested and rated.

	Core Mac Performance	Star Rating*
Apple Computer		
Performa 6360	4.0	★★★/5.3
Performa 6400/180	4.0	★★★/6.8
Performa 6400/200	5.6	★★★★/7.1
Powerbook 1400c/117 **	2.7	★★★/6.4
Powerbook 1400cs/117 **	2.8	★★★/6.4
Powerbook 1400c/133	3.5	★★★/6.6
▶ PowerBook 3400c/200	5.5	★★★★/7.6
▶ Power Macintosh 4400/200	5.5	★★★/6.5
Power Macintosh 5260/120 ***	2.6	★★★/5.5
Power Macintosh 5400/180 ***	4.3	★★★★/7.1
Power Macintosh 6400/200 ***	4.5	★★★/6.4
▶ Power Macintosh 7300/180	7.2	★★★★/7.4
▶ Power Macintosh 9600/200	8.1	★★★★/8.1
APS Technologies		
▶ MPower 603e240	6.6	★★★/6.9
▶ MPower 603e200	5.8	★★★/6.7
▶ MPower 603e180	4.5	★★★/6.4
▶ MPower 604e200	7.3	★★★★/7.0
DayStar Digital		
▶ Genesis LT 400+	7.7	★★★★/7.5
Genesis MP 720+	7.3	★★★★/7.4
Motorola Computer Group		
▶ StarMax 3000 DT603e-180	5.4	★★★/6.2
▶ StarMax 3000 MT603e-180	5.6	★★★/6.2
StarMax 3000 DT603e-200	5.8	★★★/6.5
StarMax 3000 MT603e-200	5.8	★★★/6.5
▶ StarMax 3000 MT603e-240	6.8	★★★/6.8
StarMax 4000 DT604e-160	6.6	★★★/6.7
StarMax 4000 MT604e-160	6.9	★★★/6.7
▶ StarMax 4000 DT604e-200	7.7	★★★/6.7
StarMax 4000 MT604e-200	7.7	★★★/6.7
Power Computing		
PowerBase 180	5.4	★★★★/7.4
PowerBase 200	5.8	★★★★/7.4
Power8ase 240	6.4	★★★★/7.7
PowerCenter 150	5.6	★★★★/7.0
PowerTower Pro 200	8.5	★★★★/7.9
PowerTower Pro 225	9.2	★★★★/8.2
PowerTools		
▶ Infiniti 4200 Pro	8.2	★★★/6.9
Umax Computer		
▶ SuperMac C500/180	5.2	★★★/5.9
SuperMac C600/200	5.8	★★★/6.5
SuperMac C600/240	6.3	★★★/6.7
SuperMac J700/180	7.3	★★★★/7.1
SuperMac S900/200	8.3	★★★★/7.8
SuperMac S900/225	8.8	★★★★/8.0

	Multiprocessor Performance	Star Rating*
▶ DayStar Genesis LT 400+	2.1	★★★★/7.5
DayStar Genesis MP 720+	2.6	★★★★/7.4

*Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) **Had less than 32MB of RAM, so some tests were conducted with virtual memory, which slows performance. ***Available only to educational institutions.

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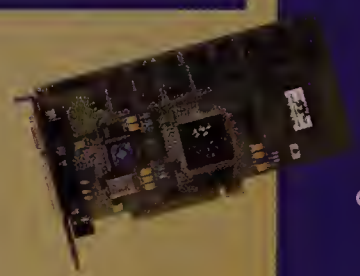

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Circle 52 on reader service card

GREAT DEALS Value-oriented Macs come in nearly as many models as Baskin-Robbins has flavors of ice cream, with prices as low as $1249 yet with good performance and other goodies.

Macworld LAB TEST

Super Mac Values

Finally, more bang for the buck: high-performance systems under $2500

by Charles Seiter

This year—1997—is the year that Mac owners finally join the rest of the planet and get high-performance systems at low prices. Simply put, today's Mac price/performance benefits are beyond anything imagined a few years ago. Roughly two years after the Mac clone era began, you can buy a powerhouse Mac for under $2500, with six using the faster-than-Pentium PowerPC 604e CPU. A year ago, a $2500 Mac was typically a compromise, like Apple's late, unlamented Power Macintosh 7200/90. Back then, there were two Mac systems between $2050 and $2500, and none that earned a *Macworld* Star Rating of ★★★★/7.0 or higher. Today, we find six systems in this price range, two of which earned a ★★★★/7.0 rating or higher. And all the systems in this price class offer about twice the performance of last year's $2500 contenders.

But the real improvement has been in the least-expensive Macs. Today, there are 13 capable Macs that cost $1550 to $2050. Yes, 13. And 4 of those rate ★★★★/7.0 or higher. A year ago, there were just three systems in that price range, with only one meriting a score of ★★★★/7.0 or higher.

And if, a year ago, you wanted to spend around $1500, you couldn't. Now you can. We found ten systems shipping under $1550, but just two merited a score of ★★★★/7.0 or higher. After all, Macs at this price are stripped-down systems, offering the essentials but few, if any, extras.

Blurred Distinctions

Most of these top-value Macs are so powerful that they tend to blur into

PHOTOGRAPHS AND SCREEN IMAGES BY KEVIN CANDLAND

nonsense the meaning of market targets such as education or home office. Maybe it seems like overkill to do junior high school homework on a 240MHz Mac with a 2GB hard drive, but some such systems are now cheaper than the Apple II with 48K of RAM that was ubiquitous in classrooms back in the 1970s.

Why did the prices drop so fast while performance shot up? There are several reasons. First, IBM and Motorola have aggressively come out with faster and faster PowerPC chips at inexpensive to moderate prices, which let Apple and other Mac makers offer more than they could in the past.

Second, the first Mac-clone maker, Power Computing, didn't just make clones—it put Mac construction on the same basis as PC clones, replacing forever Apple's carefully organized, "a different speed or configuration is a different computer" marketing strategy.

Consider just Power Computing's PowerBase line. Models listed are the PowerBase 180, 200, and 240. In the table, "The Right Options: What Each Mac Under $2500 Offers," you'll see prices and specifications for standard configurations of these three Macs. But if you check out Power Computing's Web site (*http://www.powercc.com*), you see a glimpse of the coming new style for Macs: the option to configure your own system. You pick the CPU you want, along with the amount of RAM, preferred hard drive, and other options; Power Computing then quotes you a price for your customized system, and you can order it from the Web site.

Although this is almost the opposite of the classic Apple Way, it's how things have been done for years in the Windows world, and it's now going to be part of the Macintosh existence. The payoff for you is lower prices, more features, more speed, and perhaps more important, the exact system choice you want.

603e, 604e, and Beyond

You can see some immediate directions for systems in the next few years from Macworld Lab's real-world test results (see the benchmarks, "Bargain Macs Offer Surprising Speed"). In a good design, such as that of Apple's Power Macintosh 7300/180, a 180MHz PowerPC 604e CPU can outperform a 240MHz 603e CPU at basic computational functions (the tests labeled "CPU-Intensive" in Macworld Lab's system benchmarks). Averaging results on several systems, now that enough systems are actually shipping to make the comparison, a 604e-based system usually shows 30 percent greater performance than a 603e-based system at the same clock speed.

This has several implications. First, using the same common 70-nanosecond DIMMs found in current systems, a 240MHz 604e system would be as fast as a 320MHz 603e. (Speeds much above 300MHz start to call for some serious circuit-board design modifications.)

Second, as 604e's go into larger production volume and their prices drop, you can expect to see dual-processor 604e-based systems at 250MHz rather than single-processor 500MHz systems. This is partly due to the simpler engineering and partly to a new round of Mac compilers, shipping in 1997, that let developers make their programs accommodate multiprocessing systems merely by setting a compiler flag. Multiprocessing hasn't hit the $2500-or-less level yet, but it's just a matter of time.

Beyond the CPU

While ads focus on megahertz, the speed of a Mac's PowerPC CPU doesn't tell the whole story. Other factors influence the overall performance, and because fast PowerPCs and similar motherboard designs are available to all the Mac makers, these other factors start affecting relative performance more than they did when Apple was the only game in town.

HOME, SCHOOL, AND OFFICE The $2099 Umax SuperMac C600/240 (top) is a solid home-office option, while the $1999 Apple Power Mac 5400/180 (left) is a great pick for schools. The $1695 desktop version of the Power Computing PowerCenter 150 (right) is a good small-office Mac.

To rate Mac performance, Macworld Lab created a composite index based on an array of everyday tasks. Because so many advanced Macintosh users are involved in graphics or Internet work, the CPU-Intensive and FPU-Intensive indexes are designed to tell you whether you'll be happy hosting home pages or running Adobe Photoshop on a particular system. These two indexes tell you the Mac's computational power. You'll see differences between Macs with same-speed CPUs because one Mac may have a motherboard design optimized for a specific CPU while another does not.

This Macworld Lab benchmark also includes a Disk-Intensive index. Disk performance is important, since as Mac makers have adopted the superfast CPUs

available today and made cache cards standard equipment, the drive has become a key component that can slow the system down. It's easy to take hard drives for granted, but don't.

If your typical use consists of managing lots of small (under 20K) word processing or spreadsheet files, hard drive speed is what will make your system feel snappy. The difference when upgrading from a 180MHz to a 200MHz 603e will actually be difficult to notice (after all, it's only about a 10 percent difference in CPU speed), but a hard drive with 6.7-millisecond access, compared with the currently typical 10.5ms, will make your Mac seem like a new machine every time you boot up.

You can see the effects of drive speed and system design on a particular system by looking at the Overall Score. Power Computing, for example, tends to use slower hard drives than Umax does, but Power Computing also uses faster buses and cache tricks that make the CPU perform better than the same-speed CPU on other companies' systems. The slower drives take away some of the potential that Power Computing systems' faster motherboard architectures would otherwise realize.

POWER FOR UNDER $2000 If you want to spend less than $2000, consider the $1395 PowerBase 200 desktop (left), $1695 StarMax 3000 MT603e-200 (top), and $1799 Performa 6400/200 (bottom). That leaves enough money in your wallet for a monitor and modem.

Picking the Right Value Mac

Now the hard part: which Mac is right for you? Take a look at our benchmark results and the specifications and Star Ratings in the table. Then read on for the essential evaluations on each value Mac contender.

You'll also find, each month, our ratings and benchmarks of all shipping Mac systems in the *Mac Superguide*. And if you're trying to figure out if you want an under-$2500 Mac or a system that costs more and offers a lot more performance, check out our Mac comparison "The Vast Mac Expanse" (December 1996), and the follow-up reviews of the Umax SuperMac J700/180 and Motorola StarMax 4000 series (*Reviews*, February 1997), plus our preview of Apple's latest systems (see "More Mac for Your Money," April 1997).

Apple Power Macs Just a few months ago, Apple's business-oriented systems—the Power Macs—were expensive and fairly slow compared with the new generation of clones. But a month ago, Apple (*http://www.apple.com*) began to fix that, with the introduction of two new Power Macs that offer both good value and good performance.

Of the two new under-$2500 systems from Apple, the $1749 Power Mac 4400/200 is the less impressive, as its performance is a tad under that of the same-speed systems from Motorola, Power Computing, and Umax. It offers the same basic set of features as its competitors but has fewer PCI slots than any of them, no free drive bays, and no internal SCSI connector. The 4400 does include Ethernet, unlike its competitors, but no modem, as competing systems from Umax and Motorola do. Note that the 4400 uses a different kind of DIMM than other Apple Macs, so you cannot swap RAM with most other systems. (Motorola's Macs use the same DIMMs as the 4400.)

The new $2399 Power Mac 7300/180 is another story. It tops all our other systems in this group, with a motherboard design inherited from the now-discontinued 7600 that consists mostly of slots—the CPU and other components are all mounted on independent cards, making this design an upgradable, modifiable system that Apple can likely use for several years. As an engineering feat the 7300 series is impressive; if Apple gave it a faster hard drive, it would define its own performance category at the top of our list.

Its great speed, great value, easy-to-expand design, and built-in Ethernet make it *Macworld*'s new choice as top office Mac, displacing the PowerCenter 150 from Power Computing. The 7300's only drawback is that it has just one internal expansion bay, and none that can handle an internal Zip drive; for drive expansion, the cheaper PowerCenter tower remains superior.

Apple Education Macs Apple's other Power Macs—the 5260/120, 5400/180, and 6400/200—are available only to schools. They represent a solid value, although none are barn burners when it comes to speed, and none offer more than basic expandability. Instead, they offer simplicity.

The 5260/120 is simply too slow for serious consideration. Although it is Apple's cheapest Mac, you can find Macs from other companies at lower prices and faster speeds. On the other side is the Power Mac 6400/200, a version of the Performa 6400/200 that substitutes

The Right Options: What Each Mac Under $2500 Offers

				SPEED-RELATED FEATURES								MEMORY
				CPU Type						RAM		
Company	Product	Star Rating[B]	Price[C]	604e	604	603e	CPU Speed	Cache	Bus Speed	32MB	16MB	RAM Slots
	EDITORS' CHOICE											
Apple Computer	Power Macintosh 7300/180	★★★★/7.4	$2399	●			180MHz	256K	45MHz		●	8
408/996-1010	Performa 6400/200	★★★★/7.1	$1799			●	200MHz	256K	40MHz		●	4
	Power Macintosh 6400/200[G]	★★★/6.4	$1899			●	200MHz	none	40MHz		●	4
	Power Macintosh 4400/200	★★★/6.5	$1749			●	200MHz	256K	40MHz		●	3[H]
	Performa 6400/180	★★★/6.8	$1599			●	180MHz	256K	40MHz		●	4
	EDITORS' CHOICE											
	Power Macintosh 5400/180[G]	★★★★/7.1	$1999			●	180MHz	none	40MHz		●	2
	Performa 6360	★★★/5.3	$1499			●	160MHz	256K	40MHz		●	2
	Power Macintosh 5260/120[G]	★★★/5.5	$1499			●	120MHz	none	40MHz		●	2
APS Technologies	MPower 603e240	★★★/6.9	$1999			●	240MHz	256K	40MHz	24MB		3[H]
816/483-1600	MPower 603e200	★★★/6.7	$1599			●	200MHz	256K	40MHz		●	3[H]
	MPower 603e180	★★★/6.4	$1399			●	160MHz	none	40MHz		●	3[H]
Motorola Computer Group	StarMax 4000 DT604e-200	★★★/6.7	$2495	●			200MHz	512K	40MHz		●	3[H]
800/759-1107	StarMax 4000 MT604e-160	★★★/6.7	$1795	●			160MHz	512K	40MHz	●		3[H]
	StarMax 4000 DT404e-160	★★★/6.7	$1595	●			160MHz	512K	40MHz		●	3[H]
	StarMax 3000 MT603e-240	★★★/6.8	$2195			●	240MHz	512K	40MHz	●		3[H]
	StarMax 3000 MT603e-200	★★★/6.5	$1695			●	200MHz	256K	40MHz	●		3[H]
	StarMax 3000 DT603e-200	★★★/6.5	$1495			●	200MHz	256K	40MHz		●	3[H]
	StarMax 3000 MT603e-180	★★★/6.2	$1395			●	180MHz	256K	40MHz	●		3[H]
	StarMax 3000 DT603e-180	★★★/6.2	$1249			●	180MHz	256K	40MHz		●	3[H]
Power Computing[I]	PowerCenter 150	★★★★/7.0	$1795		●		150MHz	512K	50MHz		●	4
512/388-6868	PowerBase 240	★★★★/7.7	$1895			●	240MHz	256K	40MHz		●	3
	EDITORS' CHOICE											
	PowerBase 200	★★★★/7.4	$1495			●	200MHz	256K	40MHz		●	3
	EDITORS' CHOICE											
	PowerBase 180	★★★★/7.4	$1295			●	180MHz	256K	40MHz		●	3
PowerTools	Infiniti 4200 Pro	★★★/6.9	$2449	●			200MHz	512K	40MHz	24MB		3[H]
512/891-0646	Infiniti 3160 Smart Bundle	not shipping	$1399			●	160MHz	none	40MHz		●	3[H]
Umax Computer	SuperMac J700/180	★★★★/7.1	$2499	●			180MHz	512K	45MHz		●	8
510/226-6886	SuperMac C600/240	★★★/6.7	$2099			●	240MHz	256K	40MHz		●	2
	SuperMac C600/200	★★★/6.5	$1799			●	200MHz	256K	40MHz		●	2
	SuperMac C500/180	★★★/5.9	$1349			●	180MHz	256K	40MHz		●	2

● = yes. [A] Unless otherwise noted, all include the following ports: one ADB, two serial, one external SCSI-1, two 16-bit stereo I/O, and one Mac video port. [B] Based on features, implementation, innova- except for those from APS, Power Computing, and PowerTools, which are direct prices. [D] All systems without on-board video come with a PCI video card installed. [E] Short (7-inch) cards only. [F] SCSI-1 ible with other Macs' 5V DIMM slots. [I] Other configurations are available. [J] Low-profile desktop configurations (no free drive bays) available for $100 less. [K] Has only a VGA video connector.

Ethernet for a modem and removes the cache, resulting in slower-than-Performa performance. The 6400/200 is acceptable, but again, there are better clone systems at comparable prices.

That leaves the 5400/180. Its price, integrated monitor, and decent performance combine to make it an excellent choice for the classroom, since there aren't parts to lose and few for prankish students to disconnect. We award it an Editors' Choice for best education Mac.

Apple Performa The Apple Performa systems occupy the bottom of our benchmark ratings scheme. The only mild surprise is that Apple has managed to produce a 180MHz system (the Performa 6400/180) that shows almost the same CPU rating in our tests as a 160MHz system (the Performa 6360).

These Performas are nonetheless interesting examples of industrial design, with the lowest on-board chip count of any systems we tested. The systems are reliable, and Apple customer support is a plus—but their price/performance is mediocre, even with recent price reductions; Apple skimped on expansion slots; and there isn't a cheap upgrade path. Looking at the Macworld Lab tests in detail, it's also clear that Apple is going to have to quit using Performa models as a dumping ground for its inventory of slow hard drives.

Power Computing PowerBase Power Computing, the first Mac-clone

VIDEO DISPLAY		STORAGE					EXPANSION[A]					COMMUNICATIONS	
			Hard Drive		CD-ROM Drive				Internal Bus				
VRAM (standard/ maximum)	On-board Circuitry[D]	Free Bays	1.0GB–1.9GB	2.0GB–2.9GB	Other	8×	Case	PCI Slots	SCSI-2	SCSI-1	EIDE	Modem	Ethernet
2MB/4MB	●	1		2.0GB	12×		desktop	3	●				●
1MB/1MB	●	1		2.4GB		●	tower	2[E]		●[F]		●	
1MB/1MB	●	1		2.4GB		●	tower	2		●[F]			●
2MB/4MB	●	0	1.2GB			●	desktop	2			●		●
1MB/1MB	●	1		2.1GB		●	tower	2[E]		●[F]			
1MB/1MB	●	0	1.6GB			●	all-in-one	1			●		●
1MB/1MB	●	0	1.2GB			●	desktop	1			●	●	
1MB/1MB	●	0	1.2GB		4×		all-in-one	0			●		
1MB/4MB	●	5		2.5GB		●	tower	5		●	●		
1MB/4MB	●	3	1.2GB			●	desktop	3		●	●		
1MB/4MB	●	3	1.2GB			●	desktop	3		●	●		
2MB/4MB	●	1	1.2GB			●	desktop	3		●	●		
2MB/4MB	●	3		2.5GB		●	tower	5		●	●		
2MB/4MB	●	1	1.2GB			●	desktop	3		●	●		
4MB/4MB	●	4		2.5GB		●	tower	5		●	●	●	
1MB/4MB	●	4		2.5GB		●	tower	5		●	●	●	
1MB/4MB	●	4	1.2GB			●	desktop	3		●	●	●	
1MB/4MB	●	4		2.5GB		●	tower	5		●	●	●	
1MB/4MB	●	4	1.2GB			●	desktop	3		●	●	●	
2MB/4MB	●	3	1.0GB			●	tower[J]	3	●				●
2MB/4MB	●	3	1.2GB			●	tower[J]	3	●		●		
2MB/4MB	●	3	1.2GB			●	tower[J]	3	●		●		
2MB/4MB	●	3	1.2GB			●	tower[J]	3	●		●		
2MB/4MB	●[K]	4		2.5GB		●	tower	5			●		
2MB/4MB	●[K]	4	1.3GB			●	tower	5			●		
2MB/4MB		2		2.1GB	6.7×		desktop	4	●				●
1MB/1MB	●	2	1.2GB			●	tower	3	●		●	●	
1MB/1MB	●	2	1.2GB			●	tower	3	●		●	●	
1MB/1MB	●	0	1.2GB			●	desktop	1	●		●	●	

tion, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) [C] *All prices are company estimates,*
allows only one drive to be connected. [G] *Available only to educational institutions.* [H] *Uses 3.3-volt DIMMs, which are not compat-*

maker, would be leapfrogged by competitors just as Apple is, except for a clever design feature (standard on many PCs): the CPU is on its own small circuit card, and therefore it's easy to perform a speed upgrade within the same CPU line (these PowerBase systems are all based on 603e CPUs). Ironically, Apple uses this technique on most of its Power Macs but until recently hasn't taken advantage of it: where Power Computing has one PowerBase design at three speeds, Apple has traditionally insisted on having a specific model separately designed for each speed. That's changing: witness the Performa 6400 and Power Mac 7300, which are each available in two speeds.

The PowerBase 180 makes a great choice for just under $1300, especially for schools that want solid performance at a good price. That makes the PowerBase 180 tied for our Editors' Choice award in the education category. But the PowerBase will appeal to small offices, home users, and college students, too. Why? Its performance, price, and little extras (like built-in 3-D video acceleration).

Power Computing PowerCenter Recently reborn as a tower system, the PowerCenter delivers business-level performance and basic offerings. The PowerCenter 150 falls way below $2500 (it's just $1795). *Macworld*'s Editors' Choice for best office system for months, the PowerCenter 150 now loses that designation. It continues to be a solid Mac, but it offers fewer goodies than the new Power Mac 7300 from Apple and is significantly slower than the 7300.

Power Computing advertised a PowerCenter 180 model for several months but has recently decided not to ship it after all. It would have used a 604 CPU, not the faster 604e that Apple uses in the 7300/180 and that Umax uses in the J700/180.

Umax SuperMac C600 and C500 The SuperMac models by Umax Computer offer high-end performance at a midrange price. Like Power Computing's models, they incorporate an easy CPU upgrade, so you have a system that will last you for at least a few years. Still, we've awarded none of these Macs an Editors' Choice. They're fine systems, but not finer than the competition.

The C600 series come in tower enclosures, so they offer drive-bay expansion that the low-profile desktop C500/180 does not. The C600 also comes in faster speeds—240MHz and 200MHz versus the C500's 180MHz. But these systems don't distinguish themselves from the competition in any significant way. For example, Power Computing's PowerBase series offers more expansion (more drive bays and with upgradable video RAM) plus offers 3-D video acceleration. The C600's and C500 do come with a modem (but so do Motorola's more-expandable StarMax 3000 systems) and have a front-mounted headphone jack.

Umax SuperMac J700/180 With a recent dramatic price drop, the J700/180 is a contender for a power user's office. The desktop case has four PCI slots—more than any other desktop. Its performance is strong. Apple's Power Mac 7300/180 is cheaper and easier to upgrade, but has only three PCI slots.

Motorola StarMax 3000 Motorola Computer (*http://www.mot.com/computer/*) has big plans for its Mac line, which has just had significant price cuts. The Star-

Max 3000 systems have an appealing simplicity. (The 3000 designation means a 603e processor; 4000 means a 604e.) All Motorola Mac systems have essentially the same motherboard, code-named Tanzania, which has a little jumper area in one corner that switches it from a 603e to a 604e system.

Motorola has also kept prices in line by using components originally designed for non-Mac clones—the hard drive is fast but not SCSI, and the DIMMs don't swap with Apple or other Mac-clone DIMMs. Also, there's no built-in Ethernet connection, something Macintosh users have come to expect. (The other companies' 603e-based systems lack Ethernet as well, except for Apple's Power Macs.) But you do get a modem on the StarMax 3000 models (but not on the 4000 models).

The main practical difference between the tower and desktop versions is simply the number of PCI slots—five versus three—making the tower a good choice.

Motorola recently fixed some design flaws in its StarMax series. They now come with an internal SCSI connector so you can add drives to the internal bays without buying a SCSI card. (Owners of StarMax systems that didn't have the internal SCSI can add it with an option from Motorola, the price of which has not been determined at press time.) Also now included is a VGA-to-Mac adapter so you can plug a Mac monitor into the StarMax's VGA video port. These changes, coupled with the new lower prices, have boosted the StarMax systems' Star Ratings.

While the StarMax prices at first seem competitive with those of Umax and Power Computing, the lack of CPU

Macworld LAB TEST

Bargain Macs Offer Surprising Speed

The newest generation of home- and education-oriented systems—under $2500 in most cases—pack a real punch. Notice how they compare to the now-discontinued Power Mac 8500/180, which has been a system much sought after by graphics pros, and the PowerCenter 150, which is Power Computing's mainstream business machine.

Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed from fastest overall to slowest overall. Macs listed in italics are systems costing more than $2500, presented for comparison.

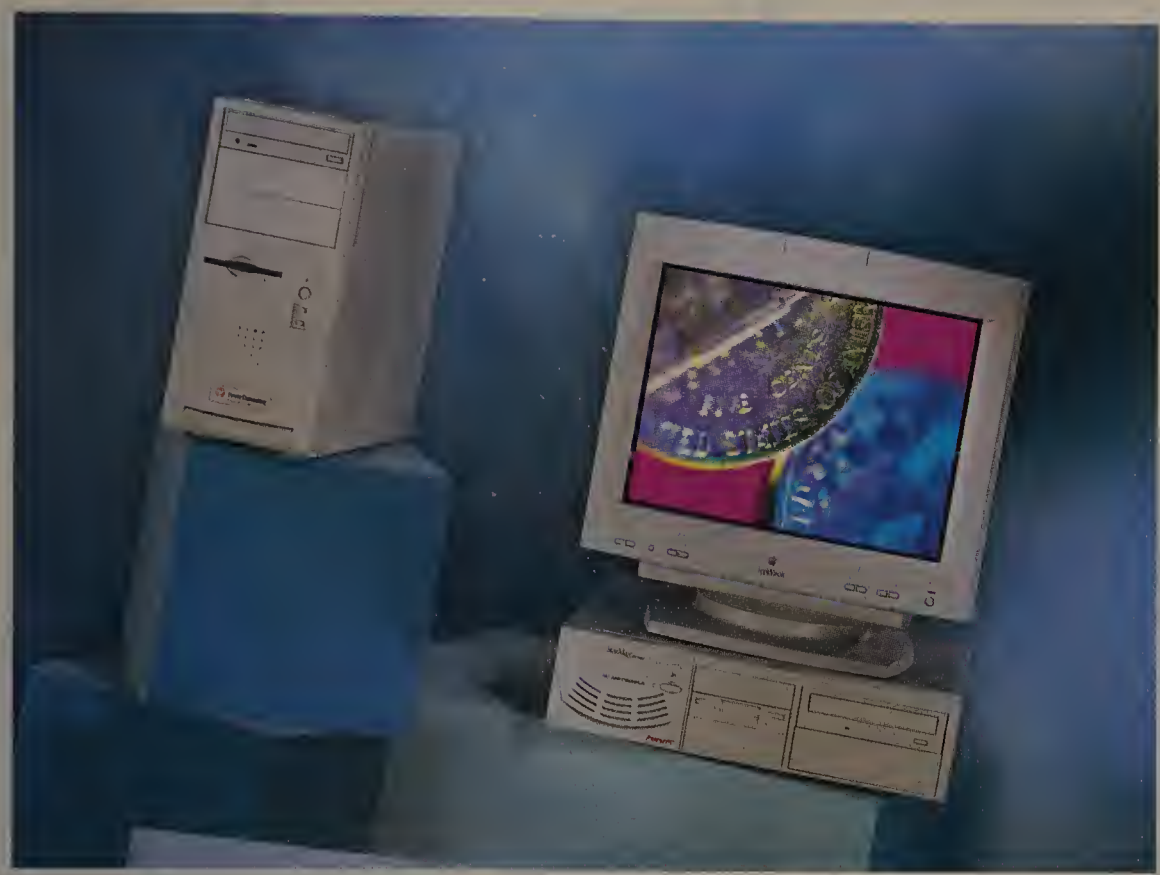
	Overall Score	CPU-Intensive	FPU-Intensive	Disk-Intensive
PowerTools Infiniti 4200 Pro	8.2	8.2	11.9	3.2
*Apple Power Macintosh 7300/200**	7.8	7.8	12.0	2.4
Motorola StarMax 4000 DT604e-200	7.7	7.9	11.4	2.5
Umax SuperMac J700/180	7.3	7.4	10.9	2.2
Apple Power Macintosh 7300/180	7.2	7.3	10.9	2.2
Motorola StarMax 4000 MT604e-160	6.9	7.1	9.7	2.6
Motorola StarMax 3000 MT603e-240	6.8	7.1	9.2	2.8
Apple Power Macintosh 8500/180	6.7	6.6	10.3	2.4
APS MPower 603e240	6.6	6.8	9.3	2.3
Motorola StarMax 4000 DT604e-160	6.6	6.7	9.7	2.2
Power Computing PowerBase 240	6.4	6.5	9.1	2.5
Umax SuperMac C600/240	6.3	6.3	9.0	2.8
Motorola StarMax 3000 MT603e-200	5.8	6.0	7.9	2.4
Umax SuperMac C600/200	5.8	5.9	8.0	2.7
Power Computing PowerBase 200	5.8	6.0	8.0	2.4
Motorola StarMax 3000 DT603e-200	5.8	6.0	8.0	2.2
APS MPower 603e200	5.7	5.9	8.3	2.1
Power Computing PowerCenter 150	5.6	5.9	7.5	1.8
Apple Power Macintosh 4400/200	5.5	5.7	7.3	2.5
Motorola StarMax 3000 MT603e-180	5.6	5.8	7.6	2.4
Apple Performa 6400/200	5.6	5.6	8.1	2.6
Power Computing PowerBase 180	5.4	5.6	7.5	2.3
Motorola StarMax 3000 DT603e-180	5.4	5.6	7.4	2.2
Umax SuperMac C500/180	5.2	5.3	7.3	2.1
APS MPower 603e180	4.5	4.8	5.8	1.8
Apple Power Macintosh 6400/200**	4.5	4.7	5.7	2.1
Apple Power Macintosh 5400/180**	4.3	4.5	5.4	2.0
Apple Performa 6360	4.0	4.2	5.2	1.9
Apple Performa 6400/180	4.0	4.1	5.2	2.0
Apple Power Macintosh 5260/120**	2.6	2.8	3.1	1.3
	Indicates typical performance in a mixed-use environment, such as a company or school.	Indicates performance for most business and personal tasks.	Indicates performance for analytical, 3-D, and other specialized uses.	Indicates performance of the Mac's data-transfer capability, which affects all users.

*Sold only to educational institutions.
**Prototype systems.

Behind Our Tests

Macworld Lab tests several functions in eight key applications plus the Finder to determine real-world performance for the three critical performance areas faced by most users: the CPU-Intensive tasks evaluate the Mac's essential computing performance; the FPU-Intensive tasks gauge performance for operations that take advantage of the floating-point unit; and the Disk-Intensive tasks gauge the performance you'll get for launching programs, opening and closing files, and copying files.

We then average the results to determine the Overall Score, giving the CPU-Intensive score 60 percent of the weight and the FPU and disk scores 20 percent each. The software includes System 7.5; Adobe Illustrator 5.5, PageMaker 5.0a, Photoshop 3.0, and Premiere 4.0, Fractal Design Painter 2.0; Microsoft Excel 5.0; Specular International Infini-D 2.6; and Wolfram Research Mathematica 2.3. All systems were run with 32MB of RAM and with 8-bit color on 17-inch color monitors.—**Macworld Lab testing supervised by Mark Hurlow**



WORTHWHILE BARGAINS Most under-$1500 systems are stripped-down, but the $1295 PowerBase 180 (left) doesn't skimp, with great expandability, fast speed, and 3-D accelerated video. The $1249 StarMax 3000 DT603e-180 offers the best price and solid performance, if not a raft of goodies.

upgradability in a fast-changing world of CPU speeds may make the StarMax systems less of a value than their prices would otherwise indicate.

APS and PowerTools Motorola doesn't just sell Macs to users, it sells them to other companies that then resell them to customers. APS Technologies (*http://www.apstech.com*) and PowerTools (*http://www.pwrtools.com*) sell what are essentially StarMax systems in different cases.

Both companies only recently began shipping systems they had advertised for months. As expected, these companies' systems offer no compelling performance difference from the Motorola versions. One functional difference is that the internal SCSI that Motorola just added to the StarMax line hasn't found its way to the PowerTools systems, although the APS systems offer it.

But the main difference is the price. APS offers its systems at much lower prices than Motorola does. PowerTools also offers bargain-basement prices, plus it lets you assemble your own Mac by buying components, such as cases and motherboards. APS has a long track record as a quality-oriented storage vendor, but PowerTools does not (see "Mac License Raises Questions," *News*, in this issue).

The Last Word

Even in this world of glorious low-cost, high-speed options, there are clear choices to be made, especially with an eye to anticipating the inevitable CPU upgrades you'll want to make. You can slice and dice these system choices several ways. If you're evaluating your choices based on price, here are our recommendations.

- In the $2050-to-$2500 price range, our top picks are the Power Mac 7300/180 and SuperMac J700/180. It's great to see Apple finally delivering a competitive business system.
- In the $1550-to-$2050 price range, your best bets are the PowerCenter 150, Power Macintosh 5400/180 (if you're a school), and SuperMac C600/200. Note that the PowerBase 240 is in very limited supply, so we cannot yet recommend it.
- In the under-$1550 price range, the choices are not as inspiring. Our top pick is the PowerBase 180, a great value with few compromises. Our second choice is Motorola's StarMax 3000 DT 603e-200, which is not as expandable or as fast as the PowerBase 180.

For most systems in this price range, the low prices come from stripping out capabilities and offering slow performance. Such a stripped Mac is better than no Mac, but a few hundred dollars can get you significant extras, so save up a bit more if you can before considering these other cheap systems.

If you're evaluating your choice by the kind of work you do or the environment you're in, check out our Editors' Choice winners, at right.

Because of a strange traveling emergency, I typed part of this article on an old Mac SE, a system that originally cost $2895 with 2MB of RAM, an 8MHz CPU, and a 20MB hard drive. How far we've come. **m**

Contributing editor CHARLES SEITER designs testing protocols for automated scientific data-collection and -analysis systems in biotechnology, as well as evaluates Mac systems.

EDITORS' CHOICE

Office System

★★★★/7.3 **Power Macintosh 7300/180** *Inexpensive* and *fast* are two adjectives that don't usually apply to the same Apple system. But they do now. Plus you get easy upgradability and known Apple quality. **Company:** Apple Computer (408/996-1010, *http://www.apple.com*). **Company's estimated price:** $2399.

Small-Office/Home-Office System

★★★★/7.4 **PowerBase 200** As fast as last year's business-oriented systems at a much lower price, this tower also offers 3-D acceleration and more VRAM than most competitors. **Company:** Power Computing (512/388-6868, *http://www.powercc.com*). **Direct price:** $1495.

Education System

★★★★/7.4 **PowerBase 180** A low price and solid performance combine with 3-D acceleration and more VRAM than the competition to make a great value. **Company:** Power Computing (512/388-6868, *http://www.powercc.com*). **Direct price:** $1295.

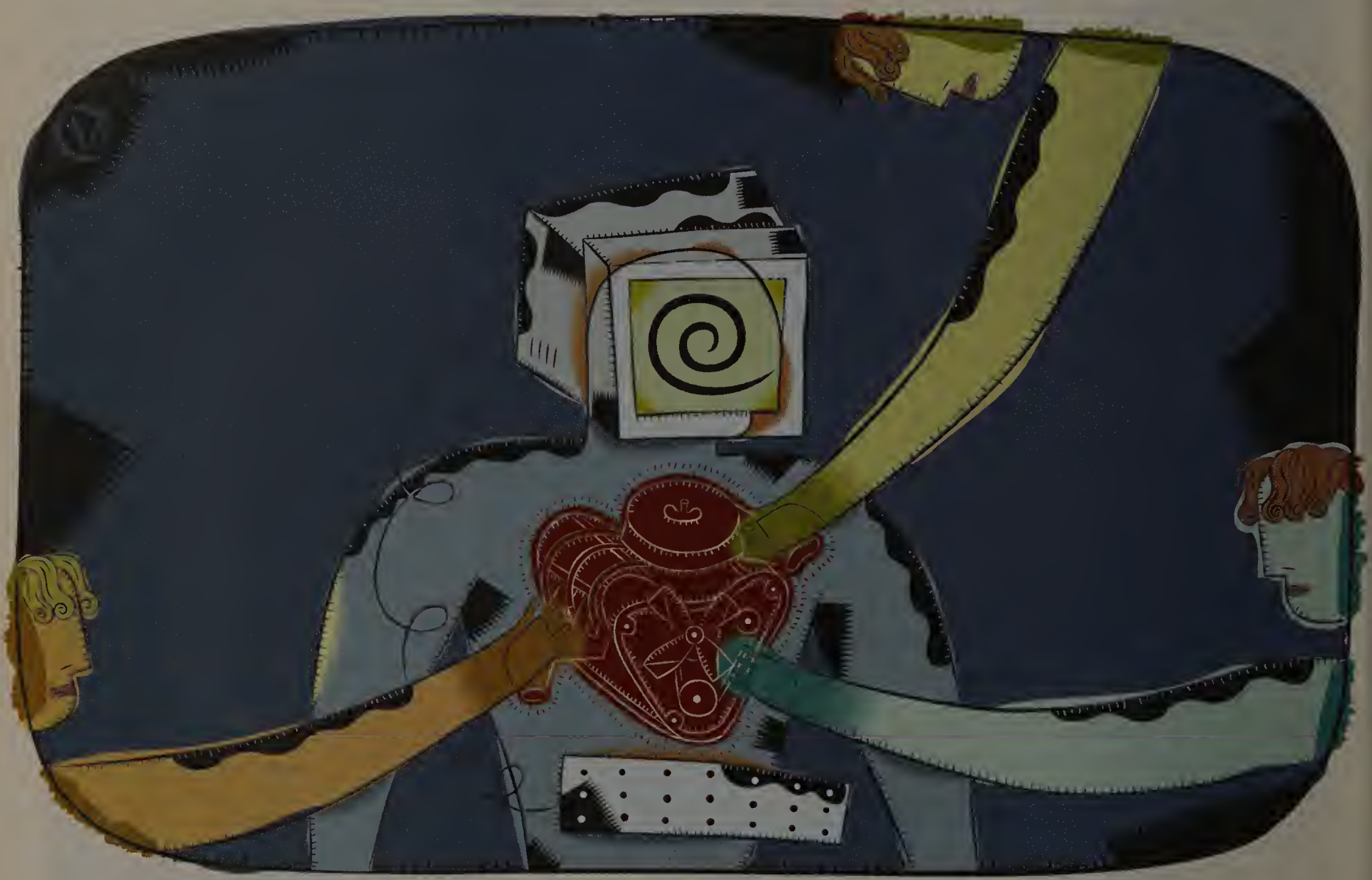
★★★★/7.1 **Power Macintosh 5400/180** Schools will like this Mac's price, built-in monitor and Ethernet, and all-in-one design, and should be prepared to live with its so-so performance. **Company:** Apple Computer (408/996-1010, *http://www.apple.com*). **Company's estimated price:** $1999 (available to educational institutions only).

REAL PRODUCTS REAL RATINGS

Reviews you can trust Unlike other publications, *Macworld* rates only final shipping products, not prototypes. What we review is what you can actually buy.

Inside

by Tova Fliegel



JEFF NEUMANN

RIGHT NOW, EVERY MACINTOSH USER IS asking the same questions: How will the OpenStep operating system from Next translate into Rhapsody, the future Mac OS? Which user-interface features, functions, and services will OpenStep add? And which Mac favorites will I be able to count on?

When this article went to press in early March, Apple had made few official announcements about which Mac services and which OpenStep services would be included in Rhapsody, saying it would release information on its decisions over time. But an examination of what OpenStep is today gives some idea of likely decisions, so *Macworld* has taken a look at OpenStep (using the current version, 4.1) to evaluate how its technologies could play into the heart of the Mac OS—and onto your desktop.

After working with OpenStep, we have good news to report: it's not all that different from the Mac OS (or Windows, for that matter)—at least not conceptually. Specific implementations and capabilities differ, but overall we enjoyed working with this high-power OS, and we think Macintosh users will, too. It's mature enough to have the services users expect—network file services and print services, for example—and advanced enough to carry users into the future. In short, Apple made a fine choice.

So what is the Next OS? You know it's an operating system, but most of you probably aren't even sure what to call it: NextStep or OpenStep. NextStep is the core operating system. OpenStep includes a set of developer APIs loaded on top of NextStep to enable rapid program development. OpenStep is available today

the NEXT OS

An In-Depth Look at What OpenStep Brings to the Mac

as a stand-alone OS for PCs (we used it on an Intel Pentium), and it is OpenStep—with some modifications—that will form the heart of Rhapsody.

Today's OpenStep is based on the Mach kernel architecture, with a version of the widely used Berkeley Standard Development (BSD) Unix that sits on top of the kernel. The Workspace Manager, Next's user-interface implementation, runs in front of all this, so users really don't see much of the OS's Unix underpinnings unless they want to. (Users can look at Unix system files through Unix Expert, if they choose.)

Rhapsody will be based on an enhanced version of Mach 2.5, which will likely include a better network-protocol stack, symmetric multiprocessing support, overall performance boosts, and additional Unix utilities. (However, Apple says it will hide these features' Unix-ness from users.)

Benefits of a Modern OS

Overarching the specifics of OpenStep's user interface and key services are the features that define an OS as *modern*, a term you've probably seen sprinkled throughout articles on this topic. The need for a modern OS is one of the main reasons why Apple bought Next. What *modern* means is an operating system that can carry users through the current era of computing and the foreseeable future.

A few key features help ensure such modernity and thus longevity: protected memory, preemptive multitasking and multithreading, and symmetric multiprocessing. No forward-looking OS can do without these features—features that Windows NT has and that Windows 95 partially has, but that System 7 lacks. Mach 2.5 now provides or, once enhanced by Apple, will provide these features.

Protected Memory We've all experienced it. Say you're plugging along in Microsoft Word or Adobe Photoshop and you're drawn into your Web browser. Somehow you don't have system resources for all three; not only does the browser program die, but all other programs die, your entire system comes to a grinding halt, and you have to restart. Once your system is back up, you have to reopen programs, and you have lost all unsaved work.

This has got to be *the* most frustrating experience for Macintosh users, and it happens because the Mac lacks protected memory. In Windows NT, programs run in their own memory space, meaning that NT reserves a portion of memory to act on each program's data instructions. On the Mac, however, all programs run in the same memory space, so when one program goes down, they all do, like so many dominoes on your desktop.

OpenStep, like NT and other modern operating systems, runs programs in their own virtual memory spaces. One of our favorite areas in OpenStep is the Processes panel with its Kill button (see the screen shot "Welcome to Your Workspace"). If one program crashes, you can kill it without shutting down other programs, including the OS—no restarting, no relaunching. Also in the Processes panel, a shaded pie chart lets you monitor

the progress of background tasks; you can pause or stop these tasks at will.

Multitasking The Mac currently assigns tasks using *cooperative multitasking*, in which the Mac gives background tasks processing time at the whim of tasks in the foreground—that is, background tasks get CPU time only when foreground tasks experience idle time and agree to release control to the background tasks.

Cooperative multitasking is much less efficient and reliable than preemptive multitasking, used by OpenStep and other modern OSs. Cooperative multitasking works smoothly only if the programs actually cooperate with each other, and many do not. In fact, a poorly behaved or malfunctioning program can prevent other programs from running at all, and can even prevent you from terminating the errant program.

In preemptive multitasking, by contrast, the OS—not the individual programs—allocates CPU time across multiple programs and OS services.

The most typical way the OS manages preemptive multitasking—and the way that OpenStep does it—is by giving each program the CPU's attention for a fraction of a second (called a *time slice*); the programs follow one another according to the priority levels assigned by a task manager or in sequential order. Because all this happens within fractions of a second, programs appear to the user to be running simultaneously.

Multithreading Further boosting processing efficiency is multithreading, in which a program or a task within a program is divided into *threads*, or processes, that can run simultaneously. An example is the ability to print at the same time you are scrolling, rather than waiting for the printing to finish before you can move on. Compare that with multitasking, in which entire programs run in parallel.

With the Threads Manager introduced in System 7.5, developers can write System 7 programs to take limited advantage of multithreading. In OpenStep, some parts of the operating system use multiple threads, but programs must explicitly use the multithreading API if they are to run multiple threads—just as in System 7.5. In addition, the OpenStep user-interface library (called the AppKit) isn't thread-safe, which means that multithreaded programs can use AppKit features in only one thread at a time. That's an extra headache a company has to look out for when writing programs.

Symmetric Multiprocessing (SMP) Using this feature, multiple CPUs on a computer carry out tasks in tandem. *Symmetric* means the CPUs can perform different tasks at the same time—for example, one CPU could be applying a Photoshop filter while another performs a spreadsheet calculation. *Asymmetric* multiprocessing means multiple CPUs can work on different parts of the same process only, dividing up the subtasks within the Photoshop-filtering task, for example. Not only is multiprocessing on the Mac asymmetric, but Mac System 7 programs must be specially written to be multiprocessing-aware.

Under a Mach-based OS like OpenStep, multithreaded programs can automatically take advantage of multiple CPUs without extra effort. The OS runs different threads of a program separately on as many CPUs as are available.

SMP is one feature already in the Be OS, which Apple also considered buying (see "Time for a New OS?" *Macworld*, February 1997). While OpenStep today does not support symmetric multiprocessing, the Mach kernel it runs on does, so SMP should be fully enabled when that capability is eventually included in the Rhapsody OS. Plus, while the current OpenStep implementation is not SMP-capable, past versions have been. For these reasons, says Avie Tevanian, the Next engineer who now heads OS development at Apple, including SMP in the Rhapsody OpenStep portion (the Yellow Box) should be easy to do.

The Rundown on Rhapsody Functionality

At press time, Apple had made few announcements about which services and capabilities it would include in the OpenStep portion of Rhapsody (all current Mac OS technologies will be available in Rhapsody's Mac OS compatibility environment). However, based on *Macworld*'s understanding of these technologies, here's a checklist of both current Mac OS and OpenStep services that are likely to be included in Rhapsody's OpenStep portion.

Service/Capability	Origin
Expected to be included	
Preemptive multitasking	OpenStep with Mach 2.5
Multithreading	OpenStep with Mach 2.5
Protected memory	OpenStep with Mach 2.5
Symmetric multiprocessing	Enhanced Mach 2.5
ColorSync color matching	Mac OS
QuickTime Media Layer (QuickTime, QuickTime VR, QuickTime IC, QuickDraw 3D)	Mac OS
QuickDraw GX: graphics and typography portions	Mac OS
Display PostScript: printing and screen-rendering portions	OpenStep
Network File System and NetInfo management	OpenStep
AppleScript scripting	Mac OS
Unicode multilanguage support	OpenStep
Fate undecided	
RenderMan 3-D rendering utility	OpenStep
Built-in e-mail and faxing	OpenStep
Apple Guide active assistance	Mac OS
Likely to be modified or removed	
OpenDoc component plug-in architecture	Mac OS
Open Transport: AppleShare and AppleTalk portions	Mac OS

Workspace versus Finder

When you launch OpenStep, you log in as Me; administrators log into the Root directory, which allows unlimited access privileges. Unix and mainframe users will recognize this approach, as will Windows 95, Windows NT, and Macintosh At Ease users in multiuser setups.

Aptly enough, OpenStep calls the main area in which you do your work the Workspace (think of it as equivalent to the Macintosh desktop), and you manage it through the Workspace Manager (sim-

Rhapsody Unifies Both New and Familiar Desktops

A LOOK AT THE MAC OS OF THE FUTURE

Rhapsody, the future Mac OS, will communicate with the Mac hardware through an enhanced version of the Mach 2.5 kernel. All three environments—the OpenStep Yellow Box, Mac OS Blue Box, and Java Runtime box—can run simultaneously, presenting a unified desktop to the user. In this simulation of how the Rhapsody desktop is likely to operate, a System 7 QuarkXPress document is updated in the Blue Box, while the Rhapsody operating system performs a file copy and empties the Trash. Adobe Photoshop filters are applied in an OpenStep-enabled version of Photoshop, which runs in the Yellow Box, and the Corel Personal Information Manager runs in Mac Java Runtime.

The kernel will provide symmetric multiprocessing, which means that systems with multiple CPUs can divide up tasks from various programs and process them simultaneously.

This area simulates the appearance of the Mac OS compatibility environment, or the Blue Box. Since the Blue Box will be a fully enabled version of the Mac OS (the Allegro version will be used in the Unified release), most System 7 applications should run in this environment.

In the Macintosh Java Runtime window, Java applets run as if they were Mac apps. You no longer need to run them in a browser.

The operating system will talk to the Mac hardware through the Mach 2.5 kernel.

This area simulates the appearance of the Next-based Mac OS's OpenStep environment, or the Yellow Box. Here, as an example of multithreading, two Photoshop filters are being applied simultaneously while the system remains responsive to the user.

ilar to the Mac Finder). (OpenStep's interface design will almost certainly be changed in Rhapsody.)

Quick Program Access As in the Be OS and Windows 95 and NT, the OpenStep desktop is partially defined by a program dock that runs along one side of the screen. The dock is a customizable listing of icons for frequently accessed programs; you can add programs to the dock for convenience (the Be OS also allows this; Windows does not), but it comes with the essential OpenStep programs and utilities ready for the clicking. Each time you open a program its icon automatically appears at the bottom of your screen.

While space on the dock is limited, OpenStep's File Viewer window includes a resizable *shelf*, essentially a framed area within the window, where you can include icons for your favorite or most frequently used programs.

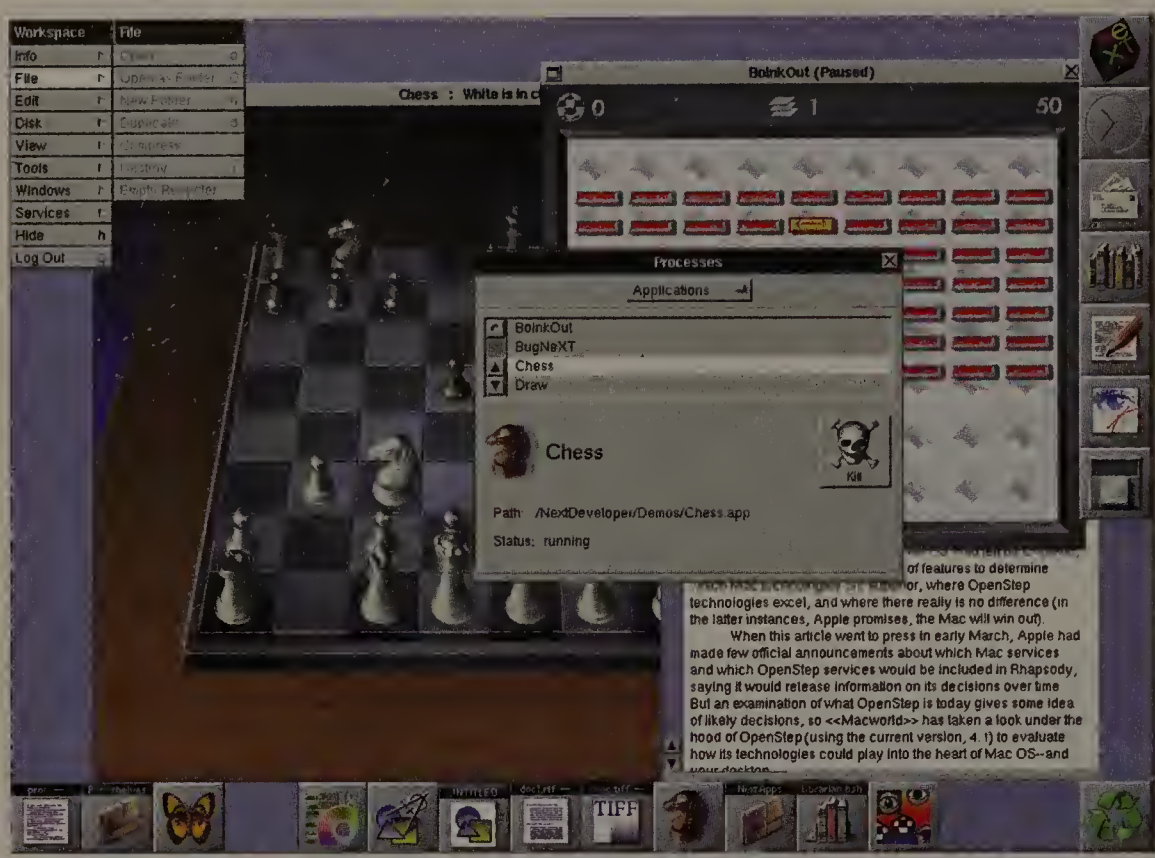
You can also drag the dock off the screen so only the Next icon is showing, and you can ⌘-drag a file icon on top of a program icon in the dock to open the file in that program (handy when you want to open a document in an application that isn't the default for that document). And to make the dock less intrusive, you can control-click on it to change whether it floats on top of all other windows.

Apple will have to decide if the dock should become part of Rhapsody. Because of the features designed to minimize its intrusiveness, the dock is only mildly distracting and easy to get used to.

But the design theory behind the dock may be a bit harder to swallow. In simplest terms, the idea is to impose greater system control over the desktop in an effort to prevent the virtual desktop from too closely resembling the user's physical workspace—an area usually strewn with papers, file folders, memos . . . you get the idea.

So, while you can create aliases (called *links*) in OpenStep, you can't create and copy aliases of programs or files to your desktop, as you can in Mac System 7, without a separate OpenStep application

PHOTOGRAPH BY PAUL FRANZ-MOORE. ILLUSTRATION BY JOHN LUND



Welcome to Your Workspace In OpenStep, the Workspace resembles the Mac desktop, and the Workspace Manager is like the Mac Finder. One of the tools within the Workspace, the Processes panel, lets you monitor the progress of your applications and terminate one or more errant programs using the Kill button, while your other applications continue running. The application dock runs alongside the Workspace (far right), providing quick access to frequently used applications. Once you launch an application, that program's icon automatically appears at the bottom of the screen. Horizontal menus stay on screen until you click them closed, in contrast to the Mac Finder's pull-down menus.

specially written to make the desktop accessible (a few freeware programs exist that do so). Instead, the dock is designed to be a controlled area through which you get quick access to programs, similar to the Apple menu in System 7.

Granted, the virtual desktops of most Macintosh users are always cluttered, but most of us will resent having the desktop defined as out of bounds, at least initially. However, it's important to recognize that most newly designed OSs use a dock, and for that reason alone, it's a good bet Apple will too. It's possible that Apple will add desktop aliases to the Yellow Box, so we can have both approaches available.

Flexible File Viewing You look at files through the File Viewer, which offers an Icon view, a Listing view, and a Browser view. Especially nice is the Browser view, which offers a quick way to look at all the contents of selected files and folders, as well as their origins. When you highlight the file or folder icon in the File Viewer shelf, the contents of that file or folder appear below it, horizontally, in separate windows in a hierarchical ordering scheme (see the screen shot "Browsing through Files"). This approach is more utilitarian than the vertical View by Name on the Mac.

In the Listing view, you can see the size, history, and permissions (read, write, and execute) of a selected file. You can also see who owns the file and which groups of users have rights. Here OpenStep's Unix underpinnings show, but the Unix model of assigning permissions will be a huge benefit for Macintosh users who choose to take advantage of it for sharing files across a network.

Also different from the Mac is OpenStep's use of file extensions. Rich Text Format files are followed by .RTF, and TIFF graphics files by .TIFF, for example. Macintosh users probably will not want to adjust to file extensions, but then, the Rhapsody engineers probably won't force extensions on users. Other than the extensions, folder and file naming will be as flexible as it is on today's Mac, except that when naming files you will want to avoid characters used for Unix coding—the forward slash (/) and ampersand (&), for example—which System 7 does allow. Plus you can have file names with as many as 1024 characters.

OpenStep uses horizontal peel-off menus, rather than vertical pull-down menus as the Mac does. This change takes some getting used to, but it's really a question of adjusting one's habits more than anything else. After working with OpenStep for a few days, its menu system became as easy to move through as the Mac's. Still, Apple is likely to retain the System 7 vertical menu style, since it's consistent across Mac programs and since Next originally chose its horizontal menu style to avoid legal problems with Apple.

Other Finder Differences Using the File Inspector and Image Inspector, you can preview the contents of a file without launching the associated program (see the screen shot "Inspector Tools"). You can also use the Tools Inspector to change the program that starts up when you open a file.

At both the file and text levels, OpenStep's find capabilities are superior to those in Mac System 7. For example, in addition to offering the usual search criteria, OpenStep lets you find a file by searching for a string of text within the file's contents or by using wild cards. (Mac OS 8 promises an improved find capability as well, including contextual search.)

The Future of Services

Clearly, OpenStep has a lot to offer, but most Macintosh users will want to see certain Mac services retained in OpenStep. The fact is that some Mac services will be dropped, some will augment OpenStep offerings, and still others will be retained.

More Cohesive Printing The Mac OS uses QuickDraw graphics and text rendering for screen display, but it uses PostScript for most high-quality printing. This dichotomy often creates frustrating differences between displayed and printed output. OpenStep's Display PostScript (DPS) imaging model provides a single, cohesive rendering technology from screen to printer. By using the same command language to render both on-screen and printed images, DPS greatly simplifies prepress proofing. DPS also brings all of PostScript's drawing capabilities to the Mac desktop, enabling direct display of Encapsulated PostScript files.

DPS lacks some Mac OS features, such as ColorSync and QuickDraw GX's extended font rendering. But Apple OS chief Tevanian says these will be merged with DPS in Rhapsody. The resulting front-to-back PostScript environment will also make the Mac an attractive engine to developers of high-end publishing products such as raster image processors and print servers.

Networking and Web Access Current Mac OS networking lacks the reliability and interoperability required of a true server-oriented network operating system. What's missing are the tools and services necessary to manage wide-area, multiplatform networks. While today's OpenStep includes an up-to-date TCP/IP implementation, OpenStep's AppleTalk protocol is outdated.

It'll be interesting to see how Apple handles this dichotomy. Apple says it will continue to rely on Open Transport for low-level network-transport protocols, such as AppleTalk, but in AppleShare IP 5.0 AppleTalk runs over TCP/IP, so the two are inextricable. Will Apple drop Open Transport in favor of OpenStep's TCP/IP services and try to update Next's AppleTalk implementation, or will Apple run Open Transport within the Yellow Box and sacrifice a superior TCP/IP stack? Our guess is that Apple will opt for the former, but doing so would likely irritate developers, who have rewritten their applications a number of times to conform to Apple's continually evolving networking architecture.

World-Class Administration More certain is that Apple will adapt OpenStep's NetInfo suite of management tools to gain world-class network-management acumen. This OpenStep feature uses a distributed object database to maintain records of users, hosts, and services. This database helps administrators remotely install software, manage security, and control access to common resources such as printers and file servers. The database-replication feature provides automatic backup protection from network outages.

NetInfo runs on several Unix implementations, including those from Digital Equipment, Hewlett-Packard, IBM, and Sun Microsystems. NetInfo includes tools for exporting database objects to other network-management systems, such as Sun's Network Information System (NIS) and systems based on Simple Network Management Protocol (SNMP), such as HP's OpenView. For users, network file sharing and printing are transparent and easy to use. OpenStep comes with a full set of Unix network tools, including clients for Telnet and FTP services. Support for NFS file sharing and BSD Unix-style network printing is built in.

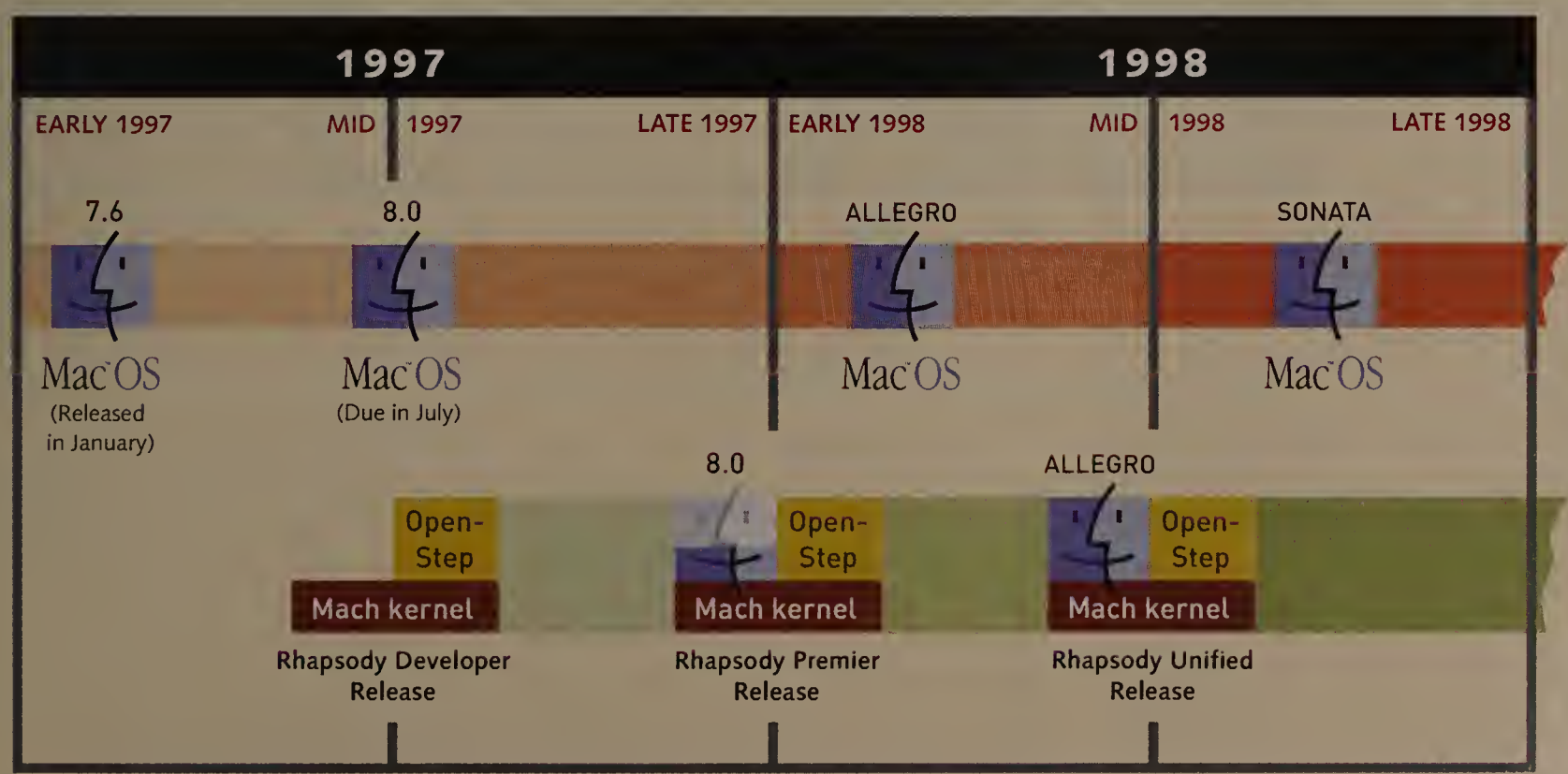
Today's version of OpenStep does not include a built-in Web browser or Web server, two features that Mac OS 8 will include. However, Apple could acquire or work with other OpenStep developers to fill those Web gaps.

Apple's Dual OS Rollout

The Next-based Mac OS effort involves a lot of pieces, so confusion is natural. The entire OS effort is code-named Rhapsody, and it comprises four parts: the Mach 2.5 kernel that manages interaction between the Mac hardware and the OS, the OpenStep OS component (code-named the Yellow Box), the Mac OS compatibility environment to run System 7 programs (code-named the Blue Box), and the Java Runtime Environment to run Java software. For more information on how these four components will interact, see the annotated screen shot "Rhapsody Unifies Both New and Familiar Desktops."

Apple plans to deliver three versions of Rhapsody: Rhapsody Developer this summer for software and hardware developers, which won't include the Blue Box; Rhapsody Premier early next year for users who want to become familiar with the Yellow Box (only a few Blue Box components will be included); and Rhapsody Unified the following summer, which will include everything.

At the same time, Apple is enhancing its current Mac OS with twice-a-year updates; the first was Mac OS 7.6 in January, and the next is Mac OS 8.0 (code-named Tempo) due out in July (see the annotated screen shot "A Sneak Peek at the Tempo Mac OS").



Browsing through Files You look at OpenStep files through the File Viewer. Here the File Viewer is in Browser mode, providing a hierarchical look at files and their directory paths. Above the file list is OpenStep's resizable *shelf*, where you can drag and drop icons for frequently used files and folders.

Inspector Tools OpenStep's Workspace Manager provides various Inspectors, such as the Tools Inspector and Image Inspector, in which you can preview the contents of a file without launching the associated program. You can also use the Tools Inspector to change the program that starts up when you open a file.

QuickTime to Remain The QuickTime Media Layer is one set of Apple technologies—QuickTime, QuickTime VR, QuickTime IC, and QuickDraw 3D—that is sure to remain in Rhapsody. Next did develop its own multimedia architecture, called NextTime, but as its market shifted toward the enterprise, Next stopped developing NextTime and the product never really saw the light of day.

Next did include the NextTime player, which lets you play QuickTime movies, with OpenStep. Also, since QuickTime has already been ported to other platforms, including Windows, it should be ported to OpenStep easily.

But Apple might want to supplement QuickTime with a high-performance video-compression technology built into NextTime. The NextTime compression algorithm can compress video at the same speed it decompresses—something QuickTime can't do. The QuickTime compression technique requires substantially more time to compress images than to play them back, which works fine when you're storing video for later playback, but not very well for interactive applications such as videoconferencing.

OpenDoc Could Go It's hard to say whether Apple will want to put more resources into the continued development of its OpenDoc container technology. The Macintosh industry has been rife with rumors lately that Apple is about to pull the plug on OpenDoc or transform it into a Java-based component technology.

OpenDoc was intended as a way to replace today's monolithic software with component programs—smaller, nimbler tools that plug into other programs, called containers. In a sense, OpenDoc was also designed to be Apple's answer to Microsoft's Object Linking and Embedding (OLE), an object-oriented programming tool, and to Microsoft's ActiveX subset of OLE. Unfortunately, the current OpenDoc implementation is not very good, and the few OpenDoc programs are not very compelling in their current forms.

Several Next products—NextStep, OpenStep, and WebObjects—already support their own object technology, called the portable distributed object (PDO) model. It's an OLE-compliant object model designed for client-server computing. Objects can interact whether they reside on the same computer or on different computers linked via a network.

Although Next hasn't been using PDO to create reusable software components (the primary goal of OpenDoc), PDO is still at least a partial answer to OLE and ActiveX, and it helps meet the need to compete with those technologies. In addition, OpenStep's Interface Builder and WebOjects include some reusable components.

Built-in Niceties

Built into OpenStep are a few more very strong capabilities that the Mac just does not have. Unfortunately, some of these technologies are not likely to make it into Rhapsody.

E-mail and Fax Services Within OpenStep is a capable e-mail system that lets you record and embed sounds, and embed graphics, into your messages. Even though at one point Apple planned to include e-mail and address-book capabilities in a future OS (remember PowerTalk?), we'd be surprised if Macintosh users get to take advantage of OpenStep's built-in offerings. Including e-mail services within the OS would seriously injure Mac e-mail companies like Apple's Claris subsidiary and CE Software, and Apple would be violating its promise not to duplicate third-party developers' efforts. OpenStep's built-in fax program could suffer the same fate.

3-D Rendering Remember Steve Jobs's other company, Pixar? Remember RenderMan, the tool that created the blockbuster *Toy Story*? It was included with pre-4.X versions of OpenStep. RenderMan is known for offering amazingly realistic 3-D photo-rendering. Its inclusion in the future Mac OS could be a huge boost for Apple. RenderMan could make it into Rhapsody, ship as an add-on, or not make it in at all; its fate is up in the air.

The Last Word

Apple had other options. It could have purchased Be, making the Be OS the heart of its operating system. While the Be OS is capable in its own right, Apple chose to buy Next and OpenStep, and for the money it gained a solid, mature operating system that will carry Macintosh users forward to the next generation of computing. If Apple can rally developers and meet its ship dates, OpenStep has the power to make the Mac platform truly compelling once again.

The good news is that OpenStep is a strong platform with strong technologies and some user-interface approaches that should complement the best Mac technologies and interface approaches. **m**

Senior associate editor TOVA FLIEGEL leads *Macworld*'s coverage of systems technologies. Contributing editor MEL BECKMAN; his trusty NextStation, Blacky; and former Next engineer CURTIS GALLOWAY contributed to this article.

A Sneak Peek at the Tempo Mac OS

NEW SYSTEM 8.0 PLANNED FOR JULY SALVAGES COPLAND'S FINDER

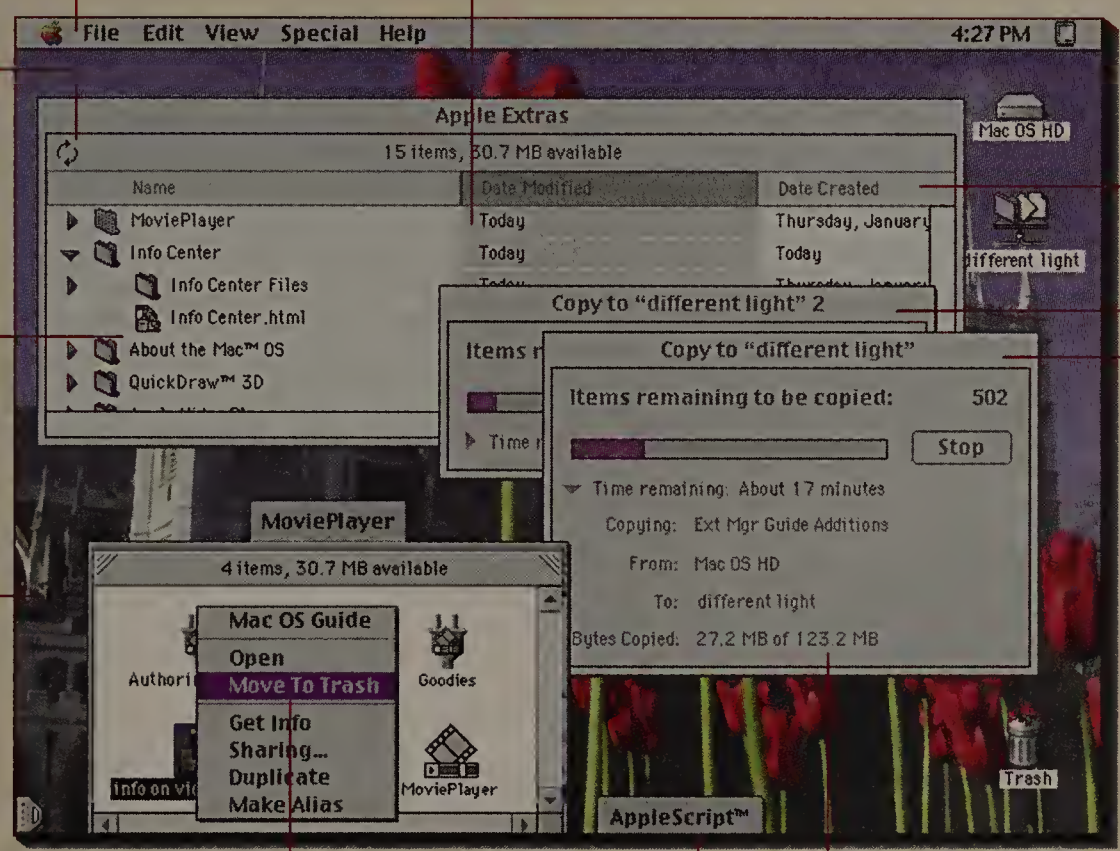
AppleSoft Marketing vice president Jim Gable has called Tempo "the most visible upgrade to the Mac in many years." Renamed Mac OS 8 in March, it uses the fully native PowerPC Finder implementation from the defunct Copland OS effort. Apple has billed tighter integration with the Internet as a key feature of Mac OS 8. Although Apple was not ready to preview this feature at press time, users are likely to see Web addresses represented as a volume on the desktop. As the screen shot below shows, the Finder will also increase the speed of operations through multithreading, because you no longer have to wait for file-management and window-display operations to complete before proceeding with other tasks. This will allow live updating of windows in the background as you work. Not shown are Mac OS 8's spring-loaded folders, which display their contents when you drag an item over them, and the ability to move a window by clicking on any edge.

Visual cues have more depth and color.

Spinning arrows in this window's header indicate that its contents are being updated in the background as you work on something else.

Users can follow grid lines for View By List to more easily discern rows and columns in list views.

Desktop Pictures extends the Desktop Patterns capability in previous system software to support the placement of a single graphic or photo across the desktop background without tiling.



You get an instantly understandable look at dates through the Relative Dates feature, which replaces the current date with "Today" and the previous day's date with "Yesterday."

Users can view files by Date Created in addition to Date Modified.

With multiple asynchronous threaded operations, you don't have to wait for multiple file-manipulation (copy, duplicate, empty Trash) and window operations (display contents) to complete before performing other operations on the desktop.

By selecting an icon or window element while pressing the control key, you can get a contextual menu display of related Finder commands. The open pop-up window now includes resize handles in the upper left and right corners.

View As Pop-up Window makes any Finder window quickly accessible from the bottom of the desktop screen. Windows can be opened, as is the Movie-Player window, with a single click or using drag and drop.

For each copy operation, the enhanced Copy status dialog box displays time remaining, bytes already transferred and remaining to be transferred, current file being copied, and the source and destination.

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*Monitors are not included. Filling all available drive bays may exceed power limitations.

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VIDEO TOOLS' TOP STARS

Dazzle your viewers with the latest special effects

by Jim Heid

Special effects are the spice that seasons video productions. A glittering logo with stars bursting from its center, a transition in which one image pushes another off the screen, a meteorologist standing in front of a hurricane—whether you're a broadcast-video professional, a producer of training or promotional videos, or a QuickTime tinkerer, effects like these are essential ingredients in your video kitchen.

All video-editing software packages—those programs you use to edit and combine clips into a finished product—include a variety of built-in effects. The most popular, Adobe Premiere 4.2 ($795; 408/536-6000, *http://www.adobe.com*), provides more than 60 of them (see *Reviews*, *Macworld*, March 1996). High-end editing systems that rely on proprietary editing software, such as many members of Media 100's (508/460-1600, *http://www.media100.com*) Media 100 family, also provide effects—and often provide dedicated hardware that speeds up the process of rendering them.

Just as good cooks search for ingredients that set their dishes apart from the pack, good video producers seek out effects that go beyond those included with their software. Good news: a bushel of effects software is available, ranging from stand-alone packages to plug-in modules that expand the effects capabilities of existing editing programs. In fact, more effects packages are available for the Mac than for Windows—proof of the Mac's continuing dominance in video production.

The most powerful stand-alone effects package is Adobe's After Effects 3.1 ($995 for the base version; $1995 for the Production Bundle, which includes extra features and effects). After Effects is particularly adept at projects involving motion—for example, video clips that fly across the screen, tumbling and changing size as they move (see *Media*, in this issue, and *Reviews*, March 1996). Like Premiere, After Effects accepts plug-in modules that expand its repertoire.

To find the best plug-ins, I tested 14 collections for After Effects, Premiere, and Media 100 ranging from a $45 transition set to a $1495 image-compositing tool. (See the table, "Expand Your Effects Options with These Plug-in Collections," and check out demonstration versions on the vendors' Web sites.)

Most plug-in collections include a dozen or more effects, often having little in common. To make it easy to find the effects you need, I organize my evaluations by categories. Within each category, I point out the best options I found. Then before the credits roll, I share my picks for best all-around effects collections.

For tips on optimizing hardware for video-effects

MARC YANKUS

work, see the sidebar, "Best Hardware Upgrades for Video Effects."

Transitions: Good Investments

The transition, a segue from one clip to another, is the most common video effect. Simple transitions such as dissolves and wipes (in which one clip pushes another off the screen) can emphasize the passage of time or a change of location, or simply provide a gentler cut. Glitzy transitions such as page peels, where one clip peels away to reveal another, can convey a change of theme. Given their importance, investing in transitions is a smart way to start a plug-in collection.

MetaTools' (*http://www.metatools.com*) KPT Final Effects 3.0.1 (see *Reviews*, April 1996) and Final Effects AP 1.0 for Premiere (see *Reviews*, August 1996) each have a gorgeous three-dimensional page peel and several flavors of wipes. MetaTools' Studio Effects 1.0 also includes several wipe variants and a sharp transition called Jaws, in which a clip splits horizontally into two halves (each of which has customizable teeth), which then separate to reveal another clip.

A fun way to spice up Premiere transitions is with DigiEffects' (*http://www.digieffects.com*) TransFX 1.0. Some of its 42 transitions are silly: in Dollars, the destination clip is gradually revealed by a set of dollar signs—perfect for a Bill Gates documentary. But there are gems here, too, including two Batman-style transitions named Blam! and Pow! And at $45, TransFX is a bargain.

Gryphon Software's (*http://www.gryphonsw.com*) $119 Dynamic Effects 1.0 contains some appealing transitions as well as several distortion effects, but for bang for the buck, you can't beat Pixélan Software's Video SpiceRack 1.0, with a whopping 300 creatively designed transitions. Video SpiceRack bases each transition on a PICT file containing a customizable gradient. It's easy to load these files into a video-effects application; in Premiere, for example, you use the Gradient Wipe transition. The results are beautiful, and Video SpiceRack's tip-laden documentation is a welcome contrast to most effect products' minimalist manuals.

Top Stars For a page peel with appeal: KPT Final Effects and Final Effects AP. For a selection you won't outgrow: Video SpiceRack. For wipes: Final Effects and Studio Effects. For clever (sometimes corny) transitions: TransFX.

Motion: Make the Most of It

One of the most common effects involves putting clips into motion: flying a title across the screen, spinning a clip into view, or superimposing a clip over a slowly panning background texture.

After Effects 3.1 is the ultimate motion-graphics machine. No other program provides After Effects' combination of precise motion control and ease of use.

Luckily for Premiere and Media 100 system owners, Artel Software's (*http://www.artelsoft.com*) Boris Effects 2.1 MP comes close. Boris Effects provides far more control over motion than Premiere's lame Motion command does (see *Reviews*, January 1997). And being able to create motion effects within Premiere or Media 100 systems is convenient—it eliminates the need to render an effect in After Effects and then import it. I still prefer the After Effects user interface, but Boris Effects remains the best way to add high-octane motion graphics to Premiere or Media 100 systems.

Top Transition KPT Final Effects sports a beautiful page-peel transition. Note the light reflection at the fold point and the image mirrored on the back of the folded clip.

Top Stars For general-purpose motion magic: After Effects. For adding After Effects–style features to Premiere and Media 100 systems: Boris Effects.

Keying: Key to People Placement

Without *keying*, the weather report would be a lot less interesting. Also called *matting* and *bluescreen compositing*, keying lets you put people in front of weather-radar images, on alien spaceships, or in midair. You shoot your subject in front of a blue or green background, and then use keying software to substitute the blue or green with another scene.

Premiere and After Effects have built-in keying features; After Effects' Production Bundle provides enhanced keying features that create cleaner composites.

Boris Effects 2.1 MP has keying features that go beyond Premiere's. Besides allowing more control over keying settings, Boris Effects lets you crop out unwanted portions of the foreground image—handy when that image contains colors that don't key well.

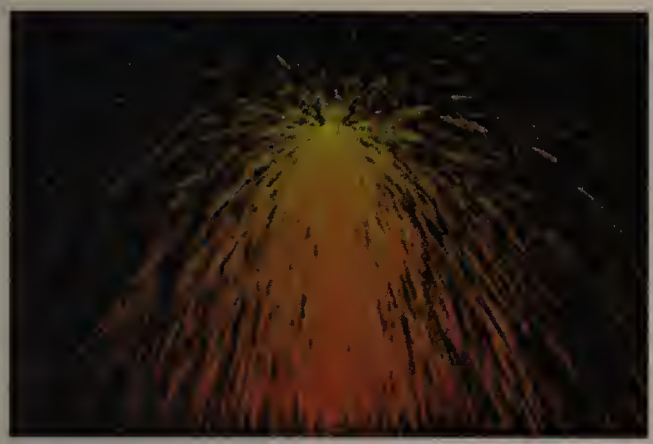
But the ultimate keying package is Ultimatte 2.0 (from the company of the same name), which works with Premiere, After Effects, and Media 100. Ultimatte the company (*http://www.ultimatte.com*) has won Oscars and Emmys for its keying technology. Ultimatte the plug-in provides far more control over keying settings than do other keying products, making it easier to get clean composites, even through smoke or wisps of hair. Ultimatte is blissfully forgiving of background-lighting irregularities, a common source of bluescreen blues. The learning curve is steep and the user interface has some rough edges, but the results are beautiful.

At $1495, Ultimatte is the most expensive product I tested. But if you rely extensively on bluescreen shots—and if you're tired of spending hours retouching Premiere-generated composites in Photoshop—Ultimatte is a must.

Top Stars For keying, After Effects' Production Bundle and Boris Effects will do, but Ultimatte will do best.

Particle Generators: Add Pizzazz

Fireworks bursting, bubbles reflecting the world around them, glittering fairy dust spewing from a magic wand—effects like these call for *particle generators*, which synthesize shapes whose size, motion, and



Fiery Flashes Create a jet of fire with Studio Effects' Particle World effect (far left); then enter warp speed, courtesy of Berserk.

color you can animate. The more control you have over how particles appear, disappear, and move, the wider the array of convincing effects you can create.

Among Premiere plug-in effect collections, only Final Effects AP provides particle generation. Fortunately, it's one great particle machine, offering all the fine-tuning options of its After Effects–based cousin, KPT Final Effects. Such options include particle birth and death size and color (which add realism to explosion effects) and gravity and turbulence (which affect how particles move). You access the nicely designed user interfaces through Premiere's standard Filters dialog box; a preview window shows how the results will look.

The larger array of particle generators is available for After Effects. KPT Final Effects sports several versatile, general-purpose particle generators. Studio Effects provides some that you won't find in other packages, including Mr. Mercury, whose particles are liquid blobs that resemble molten metal. Studio Effects' one-of-a-kind Particle World generator adds the dimension of depth: you can animate a camera position over time to fly through an explosion. The effect is awesome, although it takes some practice to master the plug-in's 3-D interface.

DigiEffects' Cyclonist 1.0 is a particle-generation specialist, well suited to creating everything from flames to floating balloons to animated textures. It's a complex plug-in with dozens of parameters and a busy user interface, but it includes dozens of canned presets to get you started, and it sports the most thorough online help of any plug-in I've seen.

DigiEffects' Berserk 1.3 also whips up particles; its StarField module creates *Star Trek*–like journeys through space, with options for controlling star shape, streaking, speed, and more.

Top Stars For Premiere (the only choice is a good one): Final Effects AP.

Best Hardware Upgrades for Video Effects

If you're working with digital video, you probably have a warehouse's worth of hard disk space and RAM. But if you plan to make effects and plug-ins a major part of your video life, you might want more of both.

Using plug-ins generally requires you to increase Premiere's or After Effects' memory allocation, so make sure you have at least 48MB of RAM, preferably 64MB or more. After Effects likes RAM; the more you allocate to it, the faster it renders.

As for hard drive storage, videos containing effects don't use any more space than ones that don't contain them, nor does more storage allow faster rendering. But you may find yourself devouring megabytes because you're trying out different effect permutations and saving each one until you decide on a favorite. If that happens, add another 2GB or so, or invest in a removable-media drive.

A 604 Chip Is Good

Most video-effects software runs on 680X0 Macs, but the calculation-intensive nature of video effects makes a PowerPC chip all but essential. In one of my tests, for example, an After Effects preview that took 165 seconds on a Quadra 840AV executed in 45 seconds on a Power Mac 9500/180MP—and that was an extremely simple project.

Within the PowerPC clan, a 604 or 604e chip is preferable to a 601 or 603—not only is the 604 family faster, but most effects packages are optimized to take advantage of its architectural enhancements.

Multiple 604 Chips Are Better

The Apple/DayStar Digital MP architecture is a godsend for video compression and effects rendering. QuickTime 2.5 provides multiprocessor support, so compression is faster in every program. But effects rendering is another story. Of the plug-ins I tested, MetaTools' Studio Effects and Artel's Boris Effects 2.1 MP supported multiprocessing.

Most vendors told me they plan to support multiprocessing in future versions. They should: the difference is dramatic.

Consider the results of my informal tests, conducted on a two-processor Power Mac 9500/180MP. An After Effects preview that took 32 seconds with one processor active took just 19 seconds with both. Rendering a short After Effects composition containing motion blur, image resizing, and motion animation took nearly 19 minutes with one processor, and just over 10 minutes with two. With video effects rendering and processors, there's definitely strength in numbers

After Effects and Premiere support multiprocessing through plug-ins available from DayStar Digital's Web site (*http://www.daystar.com*). In After Effects, most major operations—including rotation, scaling, antialiasing, blending, and creating motion blur—have been MP-enhanced for previewing and rendering. Many of the filters and plug-ins included with After Effects also support multiprocessing. In Premiere, MP-accelerated areas include clip motion, scaling, and rotation (the Motion command's options); numerous filters and transitions; transparency calculations; and file importing.

Even though most third-party plug-ins don't yet support multiprocessing, the fact that After Effects and Premiere do creates a strong argument for buying a multiprocessor machine or upgrade card.

For 3-D particle effects: Studio Effects. For warp-speed star fields: Berserk. For sheer particle power: Cyclonist.

Natural Effects: Weather Drama

Natural effects simulate Mother Nature: lightning strikes, fire, rain, snow, and fog. Use them to add realistic-looking weather to scenes or to add drama to titles or 3-D animations.

The After Effects 3.1 Production Bundle provides a lightning effect that would fool the Addams family. The effect's nearly two dozen adjustable parameters let you specify bolt color, width, branching, speed, and more. You can also specify a pull direction, which lets you simulate Jacob's-ladder devices—those sci-fi gizmos where sparks dance between two metal rods.

Lightning can cause fire, and many programs let you light it. Fire effects are usually the purview of particle generators. Final Effects makes realistic flames, but Cyclonist provides a hotter array of options.

To put out the fires, several plug-in collections include rain and snow effects. The Berserk plug-in sports a blizzard effect whose parameters include the number and size of snowflakes, their speed, and the angle at which they fall. KPT Final Effects provides similar features but lacks the last; in its world, snow falls straight down only.

And for fog, Berserk's FogBank plug-in can turn the Sahara into San Francisco. It also creates convincing smoke.

Top Stars For fun in the fog and burying blizzards: Berserk. For enlightening lightning: After Effects' Production Bundle. For fire and rain: KPT Final Effects and Cyclonist.

Lighting: Brighten or Blast

Lighting filters simulate all things illuminating: the lens flare that occurs when a camera points near a bright light, a pool of light cast on a stage by a spotlight, or the blast of a laser or photon torpedo. Use lens flare to add drama to outdoor scenes, music videos, or animated graphics. Use lasers and photon torpedoes in your battles with the Romulans.

After Effects and Premiere include lens-flare filters, but they can't hold a candle to Knoll Software's Lens Flare Pack 1.5, a set of two filters for After Effects. Lens Flare simulates a wider variety of lens types than After Effects' own filter. (The Rock Concert option yields enough glare for a Spinal Tap movie.) Scratch Filter generates beautiful light rays whose direction you can animate.

Studio Effects and DigiEffects' Aurorix 2.0 provide spotlight effects. Studio Effects lets you specify the angle of the light cone to create an oblong pool of light, and it lets you simulate gel effects, such as striped shadows cast by window blinds. Aurorix lacks these features.

As for lasers and death rays, Berserk creates convincing bursts. They convinced me, anyway; I can't speak for the Romulans.

Top Stars For lens flare with flair: Lens Flare Pack. To spotlight your video: Studio Effects. To set your phaser effects on stun: Berserk.

Media Simulation: Film and More

Media-simulation filters create film, video, print, and paint effects. Use a film effect to add scratches, dust, and jitter to simulate an old movie. Use a video effect to make a clip look as if it had been shot from a TV screen. Use print and paint effects to stylize clips.

The AgedFilm filter in Aurorix does a jaw-dropping job of simulating movie film. Apply it subtly to make digital video look like film—just the thing, the manual says, for film festivals that require entries shot on celluloid. Apply it with abandon to make a clip look 75 years old. It's the only filter of its kind, and it's a stunner.

AgedFilm pairs up nicely with Studio Effects' Burn Film filter, which simulates the melting that occurs when film jams in a projector.

Moving from film to paper, we find Berserk's NewsPrint filter, which turns a clip into halftone-like dots whose size and

Expand Your Effects Options with These Plug-in Collections

Company	Product	Star Rating *	List Price	Contact	MP Support	After Effects Support	Premiere Support	Media 100 Support
	EDITORS' CHOICE							
Artel Software	Boris Effects 2.1 MP	★★★★/7.7	$695 **	617/451-9900	●		●	●
	EDITORS' CHOICE							
DigiEffects	Aurorix 2.0	★★★★/8.5	$289	415/841-9901		●		
	EDITORS' CHOICE							
	Berserk 1.3	★★★★/8.1	$289	415/841-9901		●		
	Cyclonist 1.0	★★★★/7.5	$495	415/841-9901		●		
	TransFX 1.0	★★★/6.4	$45	415/841-9901			●	
Gryphon Software	Dynamic Effects 1.0	★★★/6.4	$119	619/536-8815			●	
	EDITORS' CHOICE							
Knoll Software	Lens Flare Pack 1.5	★★★★/8.9	$129	415/453-2471		●		
MetaTools	Final Effects AP 1.0	★★★★/8.3	$199	805/566-6200			●	
	KPT Final Effects 3.0.1	★★★★/8.9	$695	805/566-6200		●		
	Studio Effects 1.0	★★★★/8.4	$695	805/566-6200	●	●		
M.M.M. Software	HoloDozo 1.0	★★★★/8.2	$149	*holodozo@mmmsoft.com*	●	***	●	
Pixélan Software	Video SpiceRack 1.0	★★★★/8.8	$179	360/647-0112		●	●	●
Ultimatte	Ultimatte for Macintosh 2.0	★★★/6.8	$1495	818/993-8007		●	●	●
Xaos Tools	TypeCaster 2.0	★★★★/7.5	$199	415/538-7000		●	●	

*● = Yes. ● = Recommended plug-in for this effect. * Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.)*

Pick Your Medium The AgedFilm effect in Aurorix (far left) simulates old movie film, while the VideoLook filter adds TV-like scan lines.

color you can animate. It's great for creating that comic-book look.

After Effects' built-in Brush Strokes filter and Berserk's OilPaint and Van-Goghist filters make clips look like paint on canvas. Animate the brush stroke size for a fun effect. If you're into paint effects in a big way, investigate Xaos Tools' ($199; *http://www.xaostools.com*) Paint Alchemy, an Adobe Photoshop filter that works within Premiere and After Effects (for tips on using Photoshop filters for video work, see *Media*, in this issue).

Finally, to make your video look like, well, video, there's Aurorix's VideoLook filter, which creates pronounced scan lines. By animating the filter, you can simulate bad reception or a worn videotape.

Top Stars To take a video back in time or make it *look* like a video: Aurorix.

3-D: Depth-Defying Tools

Three-dimensional effects add the third dimension to video clips by projecting them onto spheres and other shapes or by distorting clips in ways that add a 3-D look. Three-dimensional transitions create dramatic scene changes, often by mapping two clips on different sides of a rotating cube; they create a high-tech impression suitable for corporate or news programming. Three-dimensional text features enable you to create spinning titles without having to buy and master a dedicated 3-D program.

The Sphere filter in KPT Final Effects and Final Effects AP wraps a clip around a sphere whose reflectivity and other surface characteristics you can control and animate. A Sphere-filtered clip looks as if it's reflected in a Christmas tree ornament.

M.M.M. Software's (*http://www.mmmsoft.com*) HoloDozo 1.0 is a horse of a different color. Built on Apple's QuickDraw 3D, it lets you map clips onto 28 different 3-D shapes, including boxes, planes, spheres, and tubes. A creatively designed 3-D interface and real-time preview make it easy to adjust settings.

For 3-D transitions, you can't beat Boris Effects for Premiere and Media 100. Boris Effects includes ten customizable 3-D transitions. Use Boris Effects'

Transitions	Motion	Keying	Particle Generators	Natural Effects	Lighting	Media Simulation	3-D	Distortion	Comments
●	●	●					●		Superb motion graphics.
			●	●	●	●		●	Versatile collection; best media-simulation effects.
			●	●	●	●		●	Great fog, blizzard, laser, and star fields.
			●						Powerhouse particle generator.
●									Economical, sometimes corny, transitions.
●								●	Solid but basic filters and transitions.
					●				Unparalled lens flare effects.
●			●	●			●	●	Best Premiere filter and transition collection.
●			●	●	●		●	●	Great page peels and wipes; flexible particle generator.
●			●		●	●	●	●	Unique particle generators; nice wipes; great spotlights.
							●		Novel 3-D clip-mapping tool; fun user interface.
●								●	Well-designed transition collection.
		●							Complex and costly, but unmatched keying.
							●		Powerful 3-D text generator.

** *Premiere-only version $350.* *** *Holo3D, an After Effects version of HoloDozo, should ship in spring.*

Total Distortion The Glass effect in Studio Effects creates a glossy, embossed appearance. These frames show the effect animated over time.

Camera track to add realism-enhancing lights and reflections.

Xaos Tools' TypeCaster 2.0 is the only 3-D text plug-in available. TypeCaster renders beautiful text whose position and location you can animate. The included CD-ROM contains hundreds of surface textures, dozens of canned presets, and several fonts, along with a clean interface that makes it easy to experiment. TypeCaster's biggest flaw: no kerning feature for tweaking character spacing.

Top Stars For text with depth: TypeCaster. For transitions with dimension: Boris Effects. To put footage on spheres: KPT Final Effects and Final Effects AP. To tap the power of QuickDraw 3D: HoloDozo.

Distortion: Lots of Good Choices

While many effects distort a clip's appearance, there's a distinct category of effect whose sole job is to warp, squish, and otherwise alter clips. It's a big club whose members have myriad applications, from simulating earthquakes to making a clip look as if it had been shot underwater.

Almost every After Effects plug-in collection includes at least a few distortion effects. Most warp or twist clips in some way, with only minor differences in their approach. But some distortion tools stand alone. Aurorix's Earthquake effect blurs a clip horizontally and vertically; testing it made me want to duck and cover. It's terrific for simulating not only plate tectonics, but also explosions, torpedo hits, and dinosaur footsteps. Aurorix's Flitter effect, which generates random noise, is great for transitions and for creating animated graphics that blow up or assemble themselves.

Remaking *Waterworld*? Use the Ripploid effect in Berserk or the Ripple Pulse effect in Studio Effects. Both simulate concentric ripples, such as those caused by a stone dropped in a pond. And to make *your* remake of *Waterworld* go down the drain, use Berserk's Spintron effect or the Flo Motion effect in KPT Final Effects. Both suck a clip into a vortex.

The Glass effect in Studio Effects is also noteworthy. It creates a glossy, 3-D appearance that makes a clip's contents look like a glass sculpture.

Top Stars To feel the earth move: Aurorix. To go underwater: Berserk and Studio Effects. To go down the drain: Berserk and KPT Final Effects. To get glassy-eyed: Studio Effects.

The Last Word

Focus on the effects you just can't live without. If you're using Premiere or a Media 100 system, that list should start with Boris Effects. No single plug-in does more to enhance Premiere's effects capabilities, particularly with 3-D transitions and motion graphics. For Premiere-based particle generation and distortion, Final Effects AP is a must-buy. For bluescreen work, there's no beating Ultimatte.

As for After Effects, every plug-in collection I tested has some gems, but in the end, I'm partial to Aurorix and Berserk. Both have a broad range of genuinely useful effects, and at $289 each they're half the price of KPT Final Effects and Studio Effects. DigiEffects also packs a lot of value into its CD-ROMs, which contain not only the plug-ins, but also demo movies, interactive documentation, and a collection of utilities and shareware.

The universe of plug-ins is expanding. By this spring, Synergy (801/281-0237, *http://www.synergy1.com*) will be shipping the $799 Hollywood FX 3.0 (101 3-D transitions and filters for Premiere and Media 100) and the $99 Hollywood FX Take 32 1.0 (32 transitions). Synergy plans to support multiprocessing in both packages. I worked with the Windows versions and was impressed with their capabilities and ease of use.

A Windows vendor moving into the Mac OS world: tell that to your friends who say developers are deserting the Mac. And while you're at it, dazzle them with a video you've created using the largest selection of effects software available for any personal computer. m

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Contributing editor JIM HEID's Web site (*http://www.heidsite.com*) focuses on media production. His latest book is *HTML and Web Publishing Secrets* (IDG Books Worldwide, 1997).

EDITORS' CHOICE

Premiere and Media 100 Plug-Ins

★★★★/7.7 **Boris Effects 2.1 MP** Sophisticated motion graphics, keying, compositing, and multiprocessing support combine to make Boris Effects the best plug-in for Premiere and Media 100 systems. **Company:** Artel Software (617/451-9900, *http://www.artelsoft.com*). **List price:** Premiere version $350; Media 100 version (also runs under Premiere) $695.

After Effects Plug-Ins

★★★★/8.5 **Aurorix 2.0** From aged film to earthquakes, Aurorix's 26 effects are eminently usable and creatively designed. The interactive documentation and sample projects on its CD are inspiring and instructive. **Company:** DigiEffects (415/841-9901, *http://www.digieffects.com*). **List price:** $289.

★★★★/8.1 **Berserk 1.3** With its fog, blizzards, lasers, star fields, oil paint, rippling water, and 14 other effects, you'll go nuts over Berserk. **Company:** DigiEffects (415/841-9901, *http://www.digieffects.com*). **List price:** $289.

★★★★/8.9 **Lens Flare Pack 1.5** This one-trick pony is a show horse. Nothing generates more beautiful lens-flare effects. **Company:** Knoll Software (415/453-2471). **List price:** $129.

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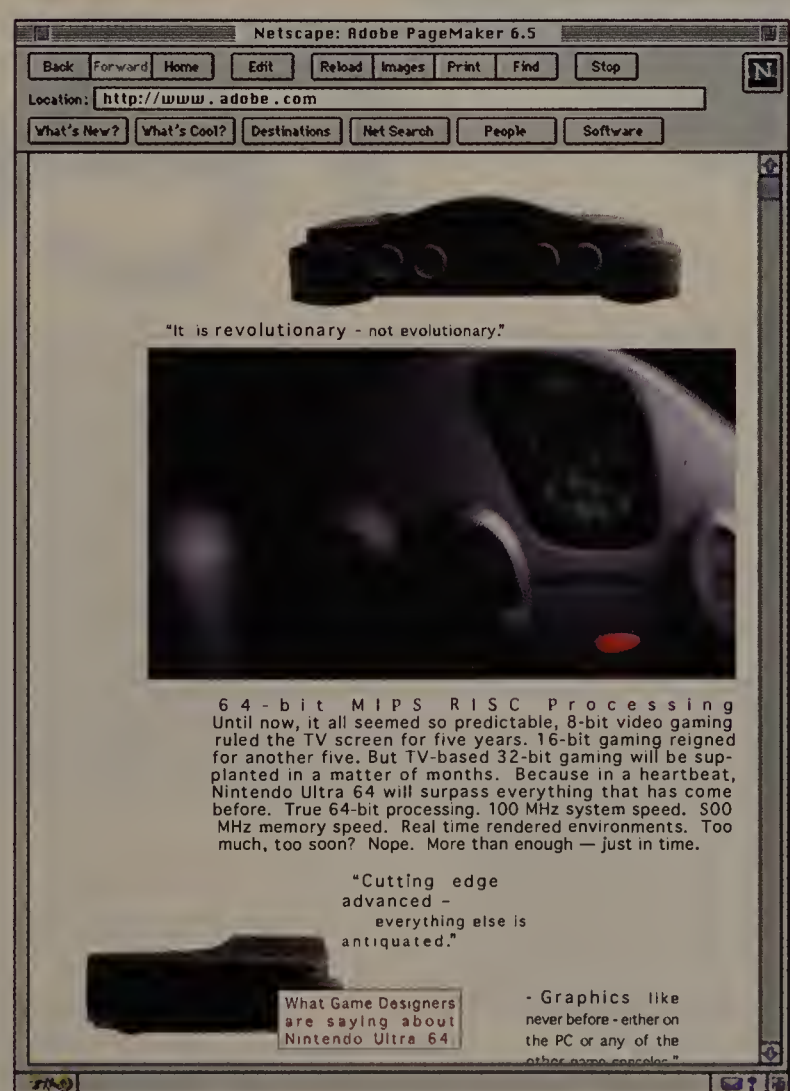

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Macworld
LAB TEST

Increase Your Storage

BARGAIN-PRICED 2GB AND 3GB HARD DRIVES MAKE IT EASY

BY HOWARD BALDWIN

ANOTHER YEAR, ANOTHER BREAKTHROUGH. IF INFLATION GREW as fast as the speed and capacities of hard drives, we'd all be pushing around wheelbarrows of cash. As it is, we're in hard drive heaven, with 2GB now representing the minimum capacity you'll find if you want to add an external drive or upgrade an internal drive. You'll pay anywhere from about $400 to $900 for a drive that ranges in size from 2GB to almost 4GB, compared with the $400 a 1GB drive cost last year. And boy, are these new drives fast!

This year, Macworld Lab tested 13 drives, including 8 drives with 2GB of capacity and 5 drives with 3GB or more. For last year's report on entry-level hard drives, we tested 17 drives, 13 of which were 2GB and 4 that were 1GB (see "Gigabyte Hard Drives," *Macworld*, June 1996). In our real-world tests, transfer rates have improved dramatically. For example, this year's pack opened a 40MB Adobe Photoshop file in 30 to 54 seconds—faster by far than last year's top rate of 57 seconds.

What gets the credit for this speed boost? Part of it is improved SCSI technology. Although the terminology is terminally confusing, more drives are using Wide SCSI, which claims transfer rates of up to 10MB per second, and Fast-and-Wide SCSI, which claims transfer rates of up to 20 MBps (although as with Ethernet speeds and EPA mileage ratings, you'll never see these theoretical transfer rates in real life). The

THE BIGGER THEY ARE, THE FASTER THEY GO These new multigig drives from ProDirect, Direct Connections, and Club Mac feature 7200-rpm mechanisms that sped through Macworld Lab's tests.

other reason for the speed boost is the jump in some drives from 4500 or 5400 revolutions per minute to 7200 rpm.

Your results will also depend on how you connect your new drive to your Macintosh—as an internal mechanism in an empty drive bay, as an external drive plugged into the external SCSI port, or as either an internal or external drive plugged into an added adapter. The 13 drives we tested featured 8 mechanisms in all (manufacturers such as IBM, Micropolis, Quantum, and Seagate sell mechanisms to vendors who make the actual drives that you purchase). To gauge what's best for you, we tested these mechanisms in three different scenarios and identified which did best in each situation (see the benchmark, "Fast-and-Wide Wins the Race").

The Best Boost in Capacity: What 2GB and 3GB Drives Offer

Company	Product	Star Rating	Company's Estimated Price (except where noted)	Phone
APS Technologies	APS Q3200	★★★/5.7	$400 (internal); $480 (external)	816/483-1600
Club Mac	Barracuda 4LP	★★★/6.4	$789 (internal); $849 (external)	714/768-8130
	Tempest 3.2	★★★/5.2	$399 (internal); $459 (external)	714/768-8130
Direct Connections	DCS 2150	★★★/6.5	$825	612/937-6283
La Cie	D2	★★★/5.7	$399	503/520-9000
	Tsunami	★★★/5.9	$499	503/520-9000
Optima Technology	DisKovery 2100W	★★★/5.7	$560	714/476-0515
ProDirect	PDI 2100WAV	★★★/6.0	$699	612/941-1805
	EDITORS' CHOICE PDI 3800	★★★★/7.5	$899	612/941-1805
Quantum	Fireball TM 21	★★★/5.4	$320	408/894-4000
	Fireball TM 32	★★★/5.7	$433	408/894-4000
Seagate	Seagate ST32171W	★★★/6.1	NP	408/438-6550
StreamLogic	Hammer 2050iS Ultra	★★★/6.1	$919 (list)	818/701-8400

Are You Willing to Open Your Mac?

The three scenarios relate to three kinds of users, and you have to determine which category you belong in. Say you want to add storage capacity, but you're more comfortable with screen savers than screwdrivers. You should buy an external drive that you can plug right into the back of your Macintosh, using the Mac's external 5-MBps SCSI bus. You'll pay more, but it's worth the convenience. We tested all eight mechanisms this way. The 3.7GB Quantum XP34550W (*http://www.quantum.com*), used in the $899 ProDirect PDI 3800 (*http://www.pdisales.com*), and the 2.0GB Seagate ST32171W (*http://www.seagate.com*), used in Seagate's drive of the same name and in the $825 Direct Connections DCS 2150, came out on top when tested with the external bus, tying in our indexed results. On a per-megabyte basis, the PDI 3800 is almost half the price of the DCS 2150, but either is a good choice for someone who just wants to plug and play. A good second choice is Club Mac's (*http://www.pacbus.com*) Barracuda 4LP, which uses the speedy Seagate ST32171N mechanism.

The next scenario: you have no qualms about opening up your computer and playing with ribbon cables and power sockets, but you don't want to spend a lot of money. With the new tower Macs (Power Mac 8500 and 9500, and Performa 6400), there's an empty drive bay waiting for you, and you can attach a drive to the Mac's internal 10-MBps SCSI bus. Get a bare-bones drive and install it yourself. We tested four of the mechanisms this way. Our winner is Club Mac's Barracuda 4LP.

Faster versus Cheaper: How SCSI Compares with EIDE

AS APPLE BEGINS USING MORE components traditionally found in PCs, you're going to have to learn some new acronyms. One we're already seeing is EIDE. On the Macintosh, EIDE drives first appeared in some Performa models; however, those machines had an external SCSI bus for use with other peripherals. EIDE drives have also started appearing in machines from APS Technologies and Motorola.

However, SCSI—still built into all Macs—is going to come in handy, thanks to its many advantages over EIDE. While EIDE drives generally cost half as much as SCSI drives of the same capacity—primarily because of the volume and predominance of PCs—they generally offer fewer revolutions per minute and slower access speeds. In fact, by any yardstick besides cost, the PC standard comes up short.

Let's start with expandability, something Macintosh users take for granted. One of the big advantages of SCSI is its ability to let you daisy-chain up to seven devices. EIDE limits you to two storage devices (hard drive, CD-ROM drive, or tape drive; no scanners allowed). On your EIDE-based Macintosh, these two devices have to be the hard drive and the CD-ROM drive, so if you want to add backup storage or another peripheral, you'll have to do so using the SCSI bus. There's no room to add anoth-

Mechanism	Capacity (in GB)	Warranty (in years)	Comments
Quantum Fireball TM32	3.00	3	At 5400 rpm, it's not as fast as the competition, but is nicely priced. A special cooling feature and easy termination are bonuses with the external version.
Seagate ST32171N	2.01	5	An ordinary-looking case masks a 7200-rpm drive that screams even when connected to the external SCSI bus.
Quantum Fireball TM32	3.00	3	This time, an ordinary-looking case masks a 5400-rpm drive that pales next to the newer competition.
Seagate ST32171W	2.01	5	A 7200-rpm speed demon whether it's connected internally or externally. But why is the SCSI ID on the bottom?
IBM DORS 32160	2.02	5	Thoughtful touches: a switch for SCSI termination and dual ports so you don't have to buy extra cable. 5400-rpm drive is middle-of-the-road in terms of speed, though.
Quantum Fireball TM32	3.00	5	The snazziest case design, but at 5400 rpm it's not the fastest drive.
Seagate ST32151W	2.10	2	An easy all-in-one solution, including adapter card and RAID software, but at 5400 rpm it's not a speedy performer.
Micropolis 4221-09	2.00	5	7200-rpm drive got a nice boost from the SCSI card, but turns in average performance on external bus.
Quantum XP34550W	3.78	5	Big, fast, at 7200 rpm nicely priced. Who could ask for anything more?
Quantum Fireball TM21	1.97	3	Like its bigger sibling, a 5400-rpm drive with clear installation instructions, but not as appealing in terms of cost.
Quantum Fireball TM32	3.00	3	Internal drive running at 5400 rpm; clearest instructions for installation by a layperson.
Seagate ST32171W	2.01	5	An OEM drive tested for comparison, this 7200-rpm drive turned in great results.
Seagate ST32171N	2.01	5	Great performance at 7200 rpm, but pricey for a 2GB internal drive.

The third scenario: you have no qualms about opening up your computer or your wallet. In that case, think about investing several hundred dollars in a SCSI adapter from a company such as Adaptec (408/945-8600, *http://www.adaptec.com*) or Atto Technology (716/691-1999, *http://www.attotech.com*). We tested the other four mechanisms this way. Check our benchmark carefully, however; with a SCSI adapter you can save about 10 seconds every time you open or save a Photoshop file, but you won't see much of a difference if you're doing database searches. The ProDirect PDI 3800 is once again your choice: its Quantum XP34550W mechanism came out on top when tested with the SCSI adapter.

Getting the Most Bang for Your Buck

Here's the key to getting the most for your money, no matter what kind of user you are. If you need the speed, go with the newer, 7200-rpm drives. If seconds count, the combination of a new SCSI adapter *and* a new drive can give you a boost. If you just need more capacity, you can save several hundred dollars and go with the older drives. Among our tested models, these include La Cie's (*http://www.lacie.com*) D2/MStol, which uses an IBM mechanism, and APS Technologies' (*http://www.apstech.com*) APS Q3200, which uses an older Quantum Fireball mechanism.

There are, of course, other factors to consider, such as the warranty and the bundled software. Thankfully, most drive manufacturers offer a five-year warranty, and even three years isn't too bad. The bundled software is either Anubis from CharisMac Engineering (916/885-4420, *http://www.charismac.com*) or Hard Disk ToolKit from FWB Software (415/463-3500, *http://www.fwb.com*). You'll probably get a limited edition of the latter product unless you get a drive from StreamLogic; its drives include a full version of Hard Disk ToolKit. Our lab testing shows that FWB's and CharisMac's formatting software are equivalent in both their ease of use and the resulting performance.

er drive with the EIDE bus.

If you want to upgrade your hard drive, capacity is also a problem. The EIDE specification only goes up to 4.3GB. You can currently add SCSI drives that store as much as 9GB of data, with 23GB drives slated for later this year. Besides, to use a bigger EIDE drive, you'll have to swap out your old drive. In this event, you must back up everything on the drive, upgrade the hardware, and then copy all the data back. When you're done, you're left with the perfectly good 1GB hard drive that you've taken out.

Speed is also an issue. Current SCSI drives offer data-transfer rates of up to 20 MBps, with newer drives claiming 40 MBps. EIDE's maximum transfer rate is 16 MBps, with a bump to 33 MBps promised for this spring.

In short, while EIDE may bring down the initial cost of a computer, that's where its helpfulness ends. For adding or upgrading drives, go with SCSI.

Macworld LAB TEST

Fast-and-Wide Wins the Race

With the right drive, you can get good performance just by plugging it into the external SCSI port, even though the Mac's external SCSI bus is slower than its internal SCSI bus. For the fastest possible results, invest in an adapter and a drive with a Wide SCSI interface. But be prepared to pay more—at least $300 more for the adapter.

Best result in test. Shorter bars are better. Times are in seconds. Mechanisms are listed from fastest overall to slowest.

		TEST SETUP		FILE-TRANSFER TESTS			APPLICATIONS TESTS		
Mechanism	Overall Performance Index	Test Configuration	Drive Interface	Copy to Drive	Copy from Drive	Duplicate	Open Photoshop File	Save Photoshop File	Database Search
Quantum XP34550W	1.00	with adapter	Wide	11.6	12.3	11.9	29.8	20.4	30.1
Seagate ST32171W	0.88	with adapter	Wide	13.1	13.1	12.4	31.7	24.0	44.8
Micropolis 4221-09	0.82	with adapter	Wide	11.7	13.0	15.4	40.3	24.1	47.2
Seagate ST32171N	0.81	internal bus	SCSI	13.7	14.4	13.4	35.4	25.3	47.9
Quantum XP34550W	0.70	external bus	Wide	18.3	17.8	21.4	43.6	28.2	32.3
Seagate ST32171W	0.70	external bus	Wide	16.8	16.9	17.3	42.3	28.3	46.7
Seagate ST32171N	0.69	external bus	SCSI	17.0	17.2	17.6	42.3	28.6	47.1
I8M DORS 32160	0.69	internal bus	SCSI	16.1	16.4	17.5	43.6	28.3	52.6
Micropolis 4221-09	0.67	external bus	Wide	16.2	17.1	18.6	45.5	30.8	48.2
Seagate ST32151W	0.67	with adapter	Wide	15.2	15.1	19.8	44.1	35.4	51.6
I8M DORS 32160	0.60	external bus	SCSI	18.8	19.0	21.7	47.7	32.9	52.9
Quantum Fireball TM32	0.60	internal bus	SCSI	18.7	17.7	21.6	44.7	32.0	70.0
Quantum Fireball TM21	0.60	internal bus	SCSI	18.6	17.8	21.7	43.9	33.4	70.1
Quantum Fireball TM21	0.58	external bus	SCSI	18.7	17.8	20.8	50.6	35.4	69.2
Seagate ST32151W	0.55	external bus	Wide	19.9	19.9	24.6	54.1	40.6	53.9
Quantum Fireball TM32	0.54	external bus	SCSI	21.4	19.4	27.0	51.2	34.7	69.9

Behind Our Tests

Macworld Lab ran Finder file-copy tests, opened and saved a 40MB Adobe Photoshop 4.0 document, and searched an 8000-record Claris FileMaker Pro database on a Macintosh 7500/100 equipped with 32MB of RAM and an L2 cache. All mechanisms were tested via the external SCSI bus. Those drives equipped with a Wide SCSI interface were also tested using an Adaptec Wide SCSI adapter.—**Macworld Lab testing supervised by Matt Clark**

If you're looking at internal drives, it's always nice to have the SCSI jumper configuration settings clearly labeled on the drive. Between Seagate and Quantum, the latter's instructions are much clearer for the average user. If you just want a one-stop bundle, Optima Technology's (*http://www.optimatech.com*) DisKovery 2100W includes an adapter card and drive. While we weren't impressed with the drive's speed, the $560 price is competitive, and having everything in one box is convenient.

With external drives, consider the case as well. Most are flat and dull (exception: La Cie's Tsunami drive, which has a unique curve, almost like a wave, along one side). Not all cases are alike, though. For reasons beyond comprehension, Direct Connections puts its SCSI ID number on the bottom of the case, while most other companies put it on the back. The SCSI ID number is easier to change from the back if you stack the multiple drives (tape, Zip, and others) that seem to populate most desktops. Another feature we like: APS and La Cie both make it easy to terminate the drive (necessary if it's the last device on your SCSI chain) just by moving a switch.

The Last Word

It's been a roller-coaster period for drive manufacturers, especially in the Macintosh market. Besides the speed boost, corporate and technological shifts have affected your choices. Seagate completed its acquisition of Conner. Singapore Technologies purchased Micropolis, spinning off a division that took a new name (StreamLogic), which in turn purchased FWB's hardware division. At the same time, some clone vendors started using cheaper EIDE drives (enhanced integrated drive electronics, to get technical; for a comparison of SCSI and EIDE, see the sidebar, "Faster versus Cheaper: How SCSI Compares with EIDE").

Although the storage vendors have been through a wild year, pandemonium hasn't precluded progress. You can't go wrong with adding a new, larger drive. Our Editors' Choice, the ProDirect PDI 3800, costs you only 22 cents per megabyte. Depending on your needs, check out the Direct Connections and Club Mac drives with the Seagate mechanisms that impressed us. Manufacturers will sometimes switch mechanisms mid-stream, so be sure to confirm when you buy or order by mail (and when you receive the drive) that it contains what you expect. Whether you want to open up your Macintosh or just plug and play, a new 2GB-plus drive can deliver the space and speed you need. m

Features editor HOWARD BALDWIN covers storage for *Macworld*.

EDITORS' CHOICE

★★★★/7.5 **PDI 3800** Using a Quantum XP34550W mechanism, this drive came in at the top of our tests. Couple that with a low price and a five-year warranty, and you've got a winner. **Company:** ProDirect (612/941-1805, *http://www.pdisales.com*). **Company's estimated price:** $899.

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MSRP	$ 2,199	$ 1,999	$ 1,599	$ 949	$ 799

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From FlashPix to Shockwave, expert ways to exploit the latest image formats

Make Your Web Graphics

by Scott Bury

For graphics professionals, the World Wide Web offers a flexibility and immediacy you can't get with print—plus a wide range of new creative opportunities. You can create a line of type that marches across the screen, a logo that spins, or a boxed pull quote that blinks on and off like a strobe light. The design possibilities are endless.

But with this new medium comes a bewildering range of new graphical file formats. Just as you had to become familiar with TIFF, PICT, and EPS for desktop publishing, now you need to get acquainted with GIF, VRML, Macromedia Shockwave, FlashPix, and other graphical file formats for the Web. It's not as daunting as it may seem, though. One of the most common image file formats you dealt with in the print world—JPEG—has became a staple of Web design. In other words, you've already got a head start.

Here's a guide to the file formats in use today—as well as those on the horizon—for adding graphics to Web pages. In this article, I explain the benefits and drawbacks of the Web's graphical file formats and describe the best uses for each format. See the sidebar, "Hot Tips for Cool Web Graphics," for practical advice on how to make the most of the file formats when designing your Web pages. The rest—whether to make your logo spin, bounce, or rocket into orbit—is up to you.

Quick, Simple Web Graphics

The majority of graphics displayed on Web pages today are in GIF (Graphics Interchange Format) or JPEG (Joint Photographic Experts Group) format. The reason is simple: both compress images into small file sizes, which speeds their transfer over the Internet.

Overall, GIF is the most popular graphical format on the Web because it's versatile and it gives you a small file that, in most cases, still looks good. Most Web browsers, such as Netscape Navigator, Microsoft Internet Explorer, and NCSA Mosaic, feature built-in support for GIF and JPEG, meaning that images in those formats don't require browser plug-ins in order to be displayed. In addition, most graphics packages, such as Adobe Photoshop and Illustrator, Macromedia FreeHand, and others, enable you to open and save GIF files. BoxTop Software offers PhotoGIF, a Photoshop 3.0 (or higher) plug-in that lets you generate smaller, better-quality GIF files ($45 company's estimated price; 601/323-6436, *http://www.boxtopsoft.com*).

The GIF format forsakes color depth

Take Off

in order to create small files, however. Unlike with most file formats, GIF images are limited to an 8-bit palette of 256 colors. As a result, GIF works best for small, simple graphics—logos, spot illustrations, clip art, and colored text blocks that don't contain rich color blends or transitions. Digital photographs and images with complex color can show banding when they are translated into GIF, and color transitions can be jarring. You'd be better off with JPEG in those cases (compare the images in "GIF Photos in Close-Up").

There are two GIF variations: transparent GIF and animated GIF. Transparent GIF creates irregularly shaped masks around an illustration or digital photo, allowing you to blend the image into a colored or patterned background. If you tried this with a regular GIF, you'd see a white box or frame around the image. Creating a transparent GIF is usually as easy as selecting the format in a Web-page–editing program's dialog box.

The animated GIF format is a simple method of adding motion by stringing together a series of sequentially changing images, like a flip book. The format works by continually replacing an image with a slightly different one, giving the illusion of movement.

CHRISTOPHER CHING

Mona in Motion In this animated GIF file located at the Reliable Web-Page Colour Web site, the Mona Lisa's face morphs into different expressions and colors.

Picturesque Color

For adding professional-looking photographic images to your Web pages, your best bet is JPEG. Like GIF, JPEG reduces the size of images to speed up transfer across a network. Unlike GIF, however, JPEG retains 24-bit color depth, giving you millions of colors—which is why it's best for digital photographs.

JPEG's main advantage is its flexibility. In image-editing programs such as Photoshop and Fractal Design Painter, you can achieve a JPEG compression ratio from about 4:1 to as great as about 20:1. The greater the compression, the smaller the file.

JPEG is a *lossy* compression scheme, meaning that it discards "nonessential" image data when compressing a file. As a result, when you decompress the image, it isn't exactly as it was before it was converted to JPEG.

JPEG compression is also unpredictable. Even at high-compression settings, some images show little apparent loss of quality. Other images, however, become blocky and grainy, even at low-compression, high-quality settings. As a rule, photos of people, particularly close-ups, don't compress well. On the other hand, photos with strong patterns and textures where close-up detail isn't as important—a catalog image of a plaid skirt, for instance—typically come through the JPEG compression with little apparent quality degradation.

While JPEG is the dominant format for high-quality images on the Web, competition is on the horizon. FlashPix, an emerging graphics format from Eastman Kodak, Hewlett-Packard, Live Picture, and Microsoft, may enable you to add high-quality photos to your Web site without slowing down the process of viewing the images on screen.

Based in part on Live Picture's IVUE format, FlashPix files contain a high-resolution version of an image plus additional copies of the graphic in lower resolutions. FlashPix has the potential to sidestep JPEG's lossy disadvantage because the original image retains its high resolution and isn't compressed.

A FlashPix file will be larger than, say, a JPEG file, however, because of the multiple versions at different resolutions. But FlashPix developers claim that working with these large images will still be fast, as you can work on only part of the image at any one time. At press time, only Live Picture 2.5 allowed you to save images in FlashPix format; no other vendors had announced support for the format.

Meanwhile, a new lossy compression method uses wavelet scalar quantization (WSQ) mathematics, which causes less of an apparent degradation of image detail than JPEG, even at equivalent compression levels. The problem with WSQ-based compression is that Web surfers will have to download and install browser plug-ins to see images in that format.

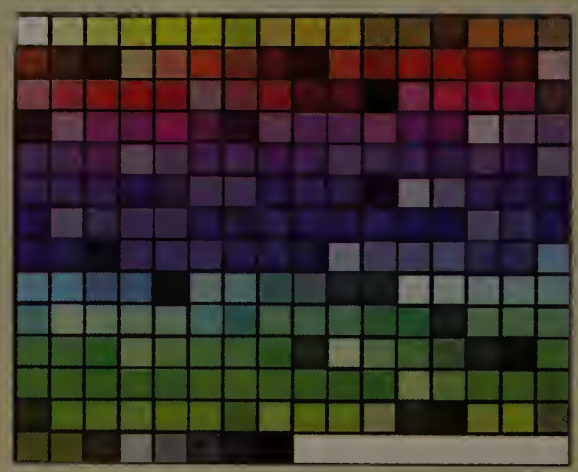
Hot Tips for Cool Web Graphics

Using these simple guidelines, you can save plenty of time in your efforts to make your Web site come alive.

Use Only "Internet-Safe" Colors The Mac and Windows platforms both have a standard 256-color palette for displaying images—but they're not the same 256 colors. Thus, an image created on a Mac may appear dithered on a PC and vice versa. To ensure that Mac and Windows users see the same colors, limit your palette to the 216 colors the two platforms share. Pantone's ColorWeb package ($29.95 list price; 201/935-5500, *http://www.pantone.com*) includes an Apple Color Picker that's restricted to the 216 "Internet-safe" colors (see *Reviews*, in this issue). You can also download an Adobe Photoshop color palette of the 216 colors from Ian Winter's Reliable Web-Page Colour Web site (*http://www.homepage.co.uk/webcolour/*).

Put Your Graphics Files on a Diet Images move over the Internet at about 1 KBps, so try to keep your image files under 40K. Larger graphics files can slow screen draws to a crawl.

Interlace Your Images Use the interlaced GIF format for graphics larger than 40K or so. Instead of loading slowly from top to bottom, interlaced files show a low-resolution, fuzzy image that gradually comes into focus as the server loads more data. You can also use the JPEG version, called progressive JPEG format, for photographic images, or the **<lowsrc=file>** tag in HTML to display a black-and-white version of your JPEG image while the color image downloads.



Internet-Safe Color Macs and PCs only have 216 RGB colors in common. To make sure the colors in your Web graphics are consistent between the two platforms, you'll need to use the "Internet-safe" color palette.

Go for the Lowest Common Denominator Ideally, your graphics should be small enough to display in their entirety on a 13-inch color monitor. Most people, particularly home users, still use 13- and 14-inch displays and

(See "Is There Life after JPEG?" *News*, November 1996, for more details on WSQ compression.)

Motion Slickness

There are three main formats for generating online animation: Shockwave, an applet for Macromedia Director that lets you create simple animated graphics; Sun Microsystems' Java language, which lets you create animations using Java applets; and as noted above, animated GIFs.

Using Java applets or creating Shockwave animations isn't for the faint of heart, but it's a simple matter to create animations using GIF files. And best of all, unlike Shockwave and Java files, animated GIF images don't require browser plug-ins or helper applications for viewing. (For a tutorial on creating GIF animations, see *Media*, September 1996.)

The GIF specification lets you add any number of sequential images to one file. In addition, the format gives control over how images are sequenced. Animated GIFs can be transparent and interlaced, include lines of text, and play once or loop endlessly. Unlike animations created in Shockwave and Java, however, animated GIFs can't include audio.

To create a GIF animation, you need a program such as GIFBuilder (freeware available at *http://152. 163.199.26/royalef/gifanim.htm*. BoxTop Software also offers a GIF animation tool, GIFmation ($89 company's estimated price); download a trial version at *http://boxtopsoft.com*.

The Web in 3-D

Three-dimensional Web sites are becoming more common, and most of the sites use Virtual Reality Markup Language (VRML) to build those in-your-face graphical environments.

VRML is a language for creating a virtual world on the Web. While the promise is great, the reality is that 3-D on the Web currently has a number of drawbacks. First, to get the full impact of a VRML-generated site, the user needs a VRML browser and, in most cases, must dedicate a significant amount of memory to enable VRML browsing.

Second, creating VRML sites requires a 3-D modeling application, such as Infini-D 3.5 by Specular ($449 company's estimated price; 413/253-3100, *http://www.specular.com*) or Ray Dream Studio 4.1 by Fractal Design ($198 company's estimated price; 408/430-4100, *http://www.fractal.com*). The 3-D modeling program lets you generate the basic VRML shapes —cubes, spheres, cylinders, and cones— and add textures, lighting, and sound.

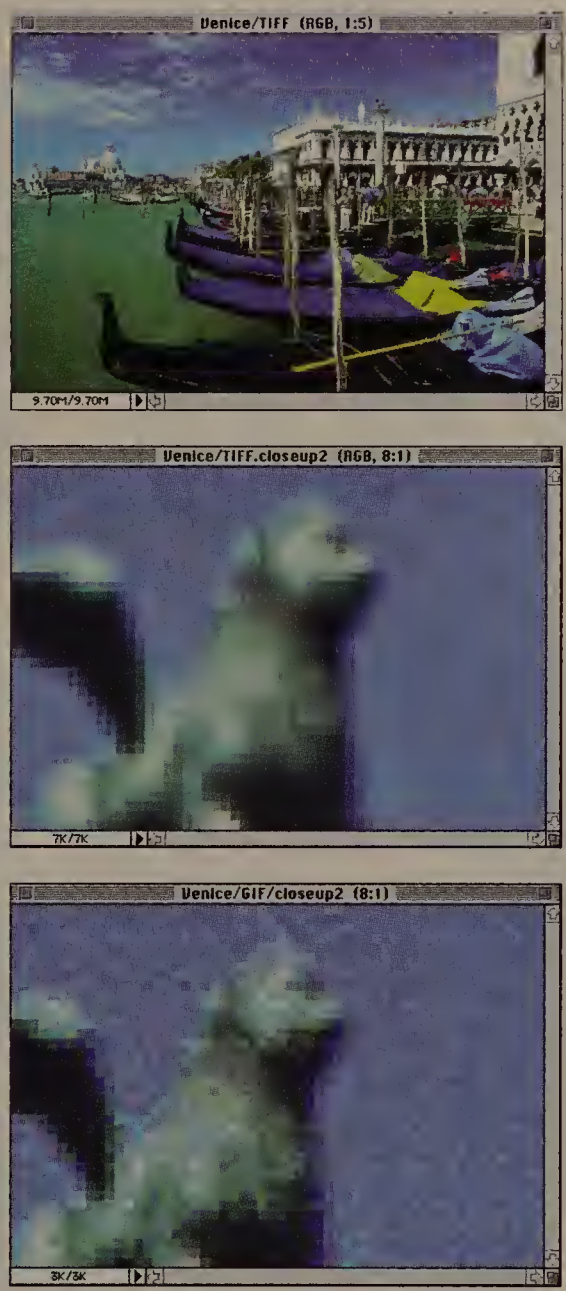
Finally, you need a VRML authoring program to build a complete virtual 3-D world. Among those available are Virtus's 3-D Website Builder ($99 company's estimated price; 919/467-9700, *http://www.virtus.com*), and Sense8's World Up and WorldToolKit programs ($4500 and $2995 list prices, respectively; 415/331-6318, *http://www.sense8.com*).

The Last Word

Ultimately, the appropriate file format for your Web graphics depends on the type of image you're creating, as well as the sophistication level of the Web user you're targeting.

For most people, GIF files are still the best bet. GIF images can hit the largest audience because they're widely supported, easily created, and quickly downloaded on screen. The JPEG format is particularly good for posting high-quality photos or images with blended colors on the Web.

Those with more ambitious Web sites in mind can roll up their sleeves and create some exciting animations with Shockwave and Java or 3-D effects in VRML. But these formats require a much higher level of expertise on the designer's part, and a significant degree of patience and interest from the viewer.



GIF Photos in Close-Up The blue sky and other details in this TIFF image of Venice (top) become noticeably blocky when the image is translated into GIF format. The difference between the file in TIFF format (middle) and in GIF format (bottom) becomes extreme when enlarged at an 8:1 ratio.

On the other hand, now's as good a time as any to gain experience with more challenging graphical formats for the Web. This year, high-bandwidth Internet services such as the cable-modem–based @Home Network will become more widely available. And with that high bandwidth comes the opportunity to create Web sites with real-time video and audio, virtual environments, and sophisticated animation.

In other words, it won't be long before today's special effects—marching text, spinning logos, and blinking pull quotes—become the Web's routine. **m**

Writer and educator SCOTT BURY specializes in graphics and online communications. He lives near Toronto, Canada.

don't want to spend extra time scrolling through the browser window just to see an entire image. Besides, large images can overwhelm your page.

Keep Your Graphics Simple Sophisticated graphics, such as Shockwave for Director animations, require the viewer to download and install a special browser plug-in. Some people won't take the time; others fear that the animations and their plug-ins will cause system crashes (a common problem), and avoid them entirely.

Offer Alternatives If you take the plunge into VRML, Shockwave, or other sophisticated Web formats, let visitors view alternative pages with simpler, speedier graphics.

Color Matching Software from Pantone

HOW THE WORLD AGREES

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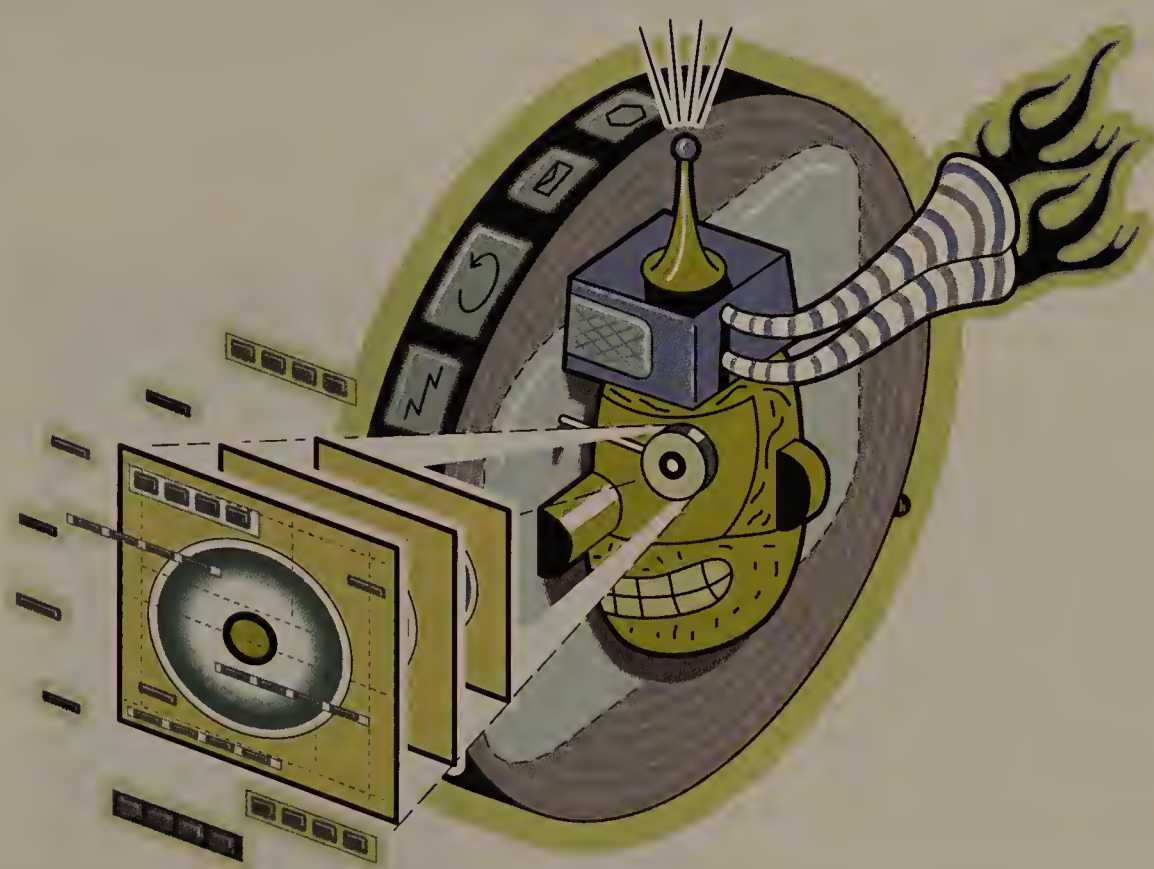
Circle 15 on reader service card

Secrets

Slogging through the Net

THEY CALL IT SURFING—BUT THESE TIPS MAKE IT FEEL LIKE SURFING

by Joseph Schorr



Exploring the Internet can be fascinating, educational, even entertaining—but I'd like to meet the guy who first described it as *surfing*. In this world of staticky phone lines, overburdened ISPs, and underpowered servers, a journey through the Web has little in common with the exhilarating, adrenaline-pumping rush of catching a wave. If you feel like you've been doing more slogging than surfing lately, here are some secrets for making Web browsing with Netscape Navigator a little bit faster and a lot more convenient.

Build It for Free

There's no shortage of commercial and shareware URL managers available—utilities that let you save, sort, and categorize your favorite Web addresses and then access them via the menu bar in any program.

Amazingly, though, you can create your own powerful URL manager—and it doesn't cost a penny, require additional RAM, or cause a single extension conflict.

Start by using Netscape Navigator's built-in Bookmark feature to bookmark all the Web addresses you want to save, then open your list of bookmarks by choosing Bookmarks from the Window menu. Now simply drag any (or all) of the bookmarks you created from the Bookmarks window to the desktop. (Or, even more convenient, drag the topmost bookmark *folder* in the hierarchy to grab *all* the bookmarks at once.) Each bookmark you drag and drop will appear on the desktop as an individual Navigator file. Double-clicking on one of these bookmark files automatically launches Navigator and connects you to the bookmarked location. Drop these files into a folder inside the Apple Menu Items folder, and you have instant, Finder-based access to all your favorite Web sites. You can, of course, rename these bookmark files however you please and organize them into additional subfolders (see "Better Browsing").

To make it easier to keep your Web-launching menu up-to-date, leave an alias of the folder containing your bookmark files out on the desktop. Now, whenever you bookmark a site in Navigator, you can just drag the bookmark to the alias, making it immediately available via the Apple Menu.

Taking all this a step further, you can drag these same bookmark files to the Launcher to set up direct, one-click button access to the Web sites you visit most. Use the Launcher's category buttons to further organize your sets of buttons (see *Secrets*, December 1996).

continues

JOHN HERSEY

Netscape Navigator: Now 56,000 Pixels Bigger!

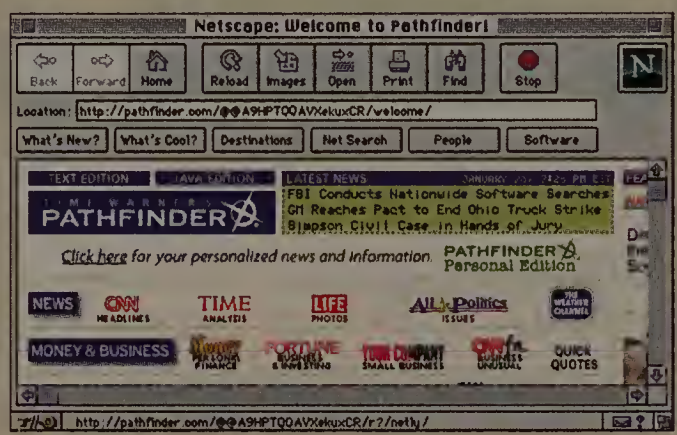
EVER NOTICE THAT WHEN YOU'RE BROWSING THE WEB WITH NAVIgator, a fairly large portion of your screen is filled with Navigator itself—buttons, icons, scroll bars, and the Location field? For a more expansive view of the Web—and a lot less scrolling—get rid of all those interface features. In the Options menu, turn off the Show Toolbar, Show Location, and Show Directory buttons. Next, press control-option-H to zap the scroll bars (with Navigator 2.0 you may have to do it twice to banish both the horizontal and vertical scroll bars). You can get the scroll bars back when you need them by pressing control-option-J.

You'll be left with a stark, clean interface that lets you fill the screen with as much of each Web page as possible.

By the way, you're not really giving anything up by scrapping all those fancy buttons. After all, the links provided by the Directory buttons are all available under the Directory window. The commands in the tool bar are all found under the View and Go menus—and all but one of those have keyboard shortcuts, which you should be using instead anyway. As for the Location field, pressing ⌘-L opens the Open Location dialog box, where you can type a new URL.

Bigger Browsing

Get Navigator's scroll bars, buttons, and other interface elements out of the way, and you have a wide-open view of every page you browse. Here's the same view before (left) and after (right) a little Navigator cleanup.



Go to the Source

Just about everyone knows you can view the source code for a Web document using Navigator's Document Source command; choosing the command opens the currently loaded page in SimpleText, allowing you to examine the HTML codes used to format the page.

Few, however, realize that *you* get to pick which application Navigator uses to display the source code. If you'd rather view the source code in, say, WordPerfect instead of SimpleText, open General Preferences under the Options menu and click on the Applications tab. In the Supporting Applications area of the dialog box, next to the words View Source, you'll see the name of the program currently selected to display source code. To change it, click on the Browse button, then pick the application you want.

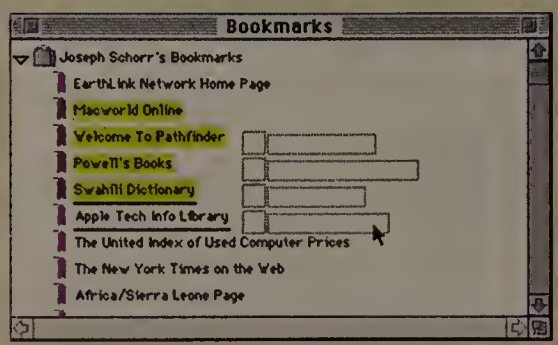
Why choose a word processing program other than SimpleText? First, so you can view HTML documents of any size; SimpleText can't open files larger than 32K. Also, if you open your source code in a more robust word processor, you can take advantage of features like find and replace, macros, spell-checking, and split-screen views—all of which are very helpful in examining and editing source code. You can even have Navigator open source code using a WYSIWYG editor such as Adobe PageMill so that you can edit the contents of a page without having to mess with the HTML code.

Drag Yourself Home

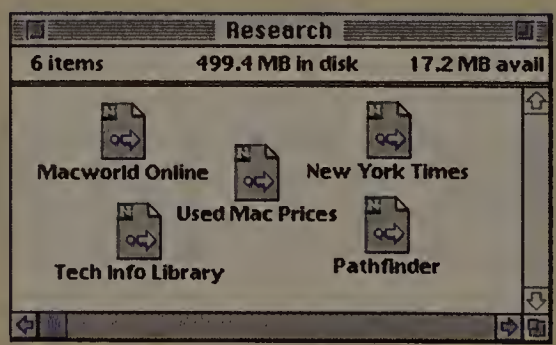
Nowadays, you seem to encounter Internet addresses just about everywhere—in press releases, e-mail, Read Me files, and so on. To use those addresses without having to retype them, select an Internet address in any drag-and-drop–aware program and drag the text directly to a Navigator browser window to connect to that address. If Navigator isn't running, drag the selected address to the desktop to create a text clipping. After you launch Navigator, grab the clipping and drag it anywhere within the browser window. ■

Contributing editor JOSEPH SCHORR is coauthor of the newly released *Macworld Mac Secrets*, fourth edition (IDG Books Worldwide, 1997).

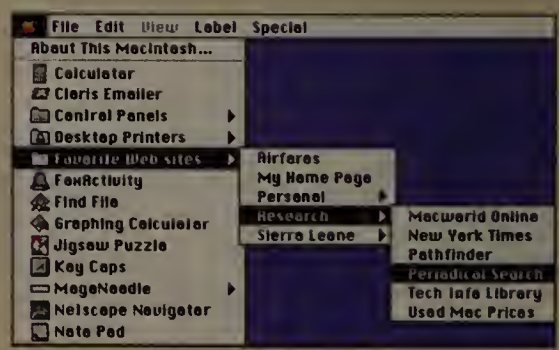
Better Browsing | TO CREATE YOUR OWN DESKTOP-BASED WEB-ADDRESS MANAGER



1. Drag Navigator bookmarks from the Bookmarks window to the desktop.



2. Each bookmark becomes a separate file, containing a link to the bookmarked site.



3. Place the files in folders within the Apple Menu Items folder, and you get a hierarchical menu of direct connections to your favorite Web sites.

Quick Tips

Tips, Tricks, and Shortcuts

by Lon Poole

Want to glimpse the future, when Web browsers may usurp the Finder's role? Nitin Verma from Ladner, British Columbia, Canada, discovered that if you drag a folder into a browser window of Netscape Navigator 2.0 or later, Navigator lists the folder contents. (You must have drag-and-drop capability, which comes with System 7.5 and later.) You can even save the catalog as a file. Files and nested folders become clickable links, and if you click an HTML file (a Web page), a text file, a JPEG graphic file, or another file format that Navigator can handle, Navigator displays the file's contents.

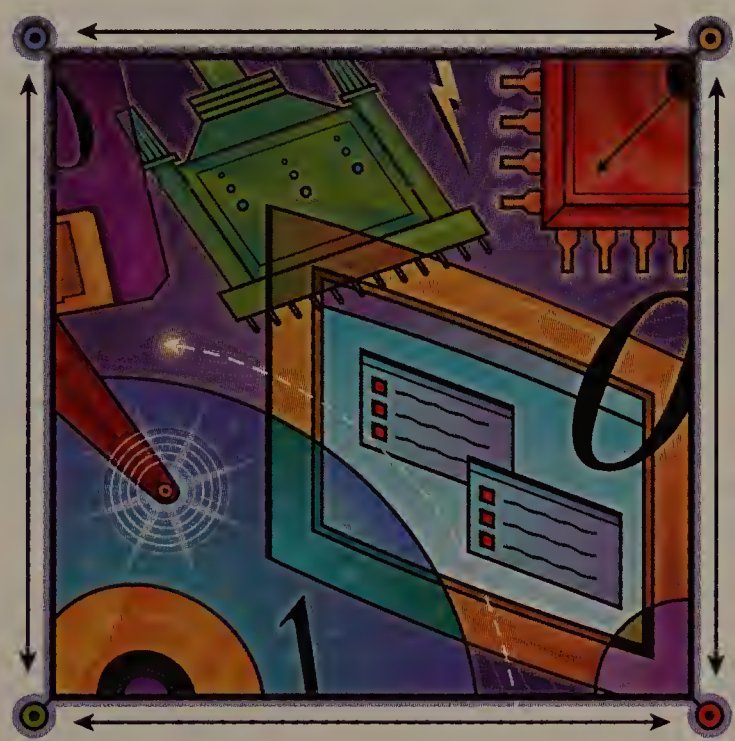
You can also view kinds of files for which you have configured Navigator to use a plug-in or a helper application. For instance, you can view a QuickTime movie by clicking its file name if you have configured Navigator to use the QuickTime plug-in or the MoviePlayer application. It's a perfect way to catalog and browse clip art.

In Microsoft Internet Explorer 2.1 and later, you can make a bookmark to launch another program such as NCSA Telnet or Claris Emailer. Richard Hayes of Chandler, Arizona, provides these directions: Open the Favorites window and choose Import from the File menu. In the Open dialog box that appears, navigate to the application you want to bookmark, select it, and click the Open button. In the Favorites window, click the program bookmark once to select it, and choose Get Info from the File menu. In the Get Info window's URL section, change *file* to *launch*. Now you have a bookmark that opens an application. If you want to be really fancy about it, move the new link to the Toolbar Favorites folder inside the Favorites folder (Internet Explorer 3.0 only).

More Start-up Sounds

Q. Is there any way to copy sounds from the Scrapbook to Apple's SimpleSound application or the Monitors & Sound control panel? This was easy to do using System 7.1, but it doesn't appear to be possible in 7.5.3.

JAMIE WOOD
San Jose, California



A. You can still paste sounds copied from the Scrapbook into the Alert Sounds section of the Sound control panel. If your Mac has the Monitors & Sound control panel and the SimpleSound application, which are the chief means of adjusting sound settings and making simple sound recordings on PCI Macs using System 7.5.3 and later, look for the Sound control panel in the Apple Extras folder on your start-up disk (not in the Control Panels folder). Don't overlook the drag-and-drop method of adding to available alert sounds with System 7. You can drag sound files from a folder window, a disk window, or the desktop to the System file icon, the System file window, or the System Folder icon. If the files are the right kind (ones identified as *sound* in their Get Info windows), the Finder adds them to the alert sounds in the System file. You can convert various kinds of sound files, like AIFF, Wave (a Windows sound file), and AU files, to the kind that can go into the System file by using a program such as Norman Franke's free SoundApp 2.2.2.

By the way, if you use SimpleSound's New command to record and save a new sound, the resulting SimpleSound document contains a sound in the Audio Interchange File Format (AIFF). The Finder can't play an AIFF sound file directly (for example, as an item in the Startup Items or Shutdown Items folders). To record a sound that the Finder can play directly, open the Alert Sounds window in SimpleSound (by choosing Alert Sounds from the Sound menu); click the Add button to record and save a new sound as part of the System file; open the System file (in the System Folder); and drag the sound you just added out of the System file window onto the desktop.

AppleTalk and TCP/IP Confusion

Q. I have heard a lot of hype about Apple's Open Transport, so I've tried to use it for accessing the Internet. However, a problem pops up. Open

continues

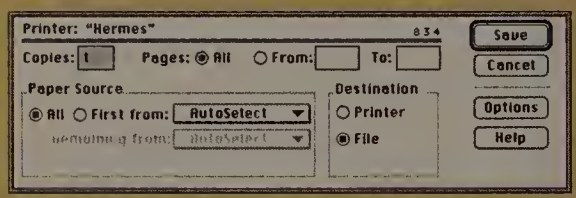
JEFFREY PELO

Better Graphics in Word

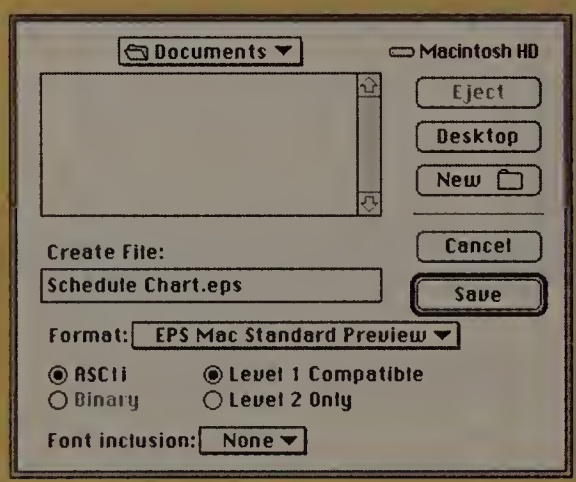
ANYONE WHO'S USED THE HORRIBLE DRAWING tools in Microsoft Word 6.0.1 (or 5.1) can attest that it's better to import graphics into a Word document instead. However, as reader Michael Hong Jr. of Torrance, California, notes, Word has a tendency to reformat imported graphics. For example, when I copy rows of tasks from a Microsoft Project document and paste them into a Word document, Word removes blank rows, changes fonts, and makes other formatting changes. What's worse, some programs, such as AEC Software's FastTrack Schedule, won't copy and paste into Word at all. The solution? Save your graphic as an EPS file using the Print command in the program that created the graphic, then use Word's Insert Picture command to import the EPS file.

1. Make sure the LaserWriter driver is selected in the Chooser (or a LaserWriter desktop printer icon is selected if you use desktop printing), even if you don't have a LaserWriter connected.

2. In the Print dialog box for the LaserWriter, select File as the destination (instead of Printer) and click the Save button.



3. In the Save dialog box that appears, choose EPS Mac Standard Preview from the Format pop-up, name the EPS file, and save it.



4. In Word, set your insertion point where you want the graphic placed. Choose Picture from the Insert menu and select the EPS file from the Open File dialog box that appears.

5. The result? Your Word document has a graphic with no formatting oddities.

Transport seems to require that AppleTalk be active. With AppleTalk active, my Color StyleWriter Pro printer connected to the printer port isn't recognized; therefore I can't print anything while using Open Transport. I can't connect the printer to the modem port, because the modem would have no place to connect to. Am I missing a step in setting up Open Transport that would allow use of the printer? The Apple Guide was little help on this matter. What other manuals or guides might there be for instructions on using Open Transport?

MICHAEL MERWIN
Augusta, Georgia

A. You can probably connect to the Internet without making AppleTalk active. The Internet is a TCP/IP network, which under Open Transport you configure with the TCP/IP control panel. If the TCP/IP control panel's Connect Via option is set to Ethernet or to some form of PPP or SLIP, such as FreePPP or MacPPP, you can make AppleTalk inactive with the Chooser.

You can also make AppleTalk inactive with the AppleTalk control panel by clicking the Options button in the control panel's window (if you don't see an Options button, use the User Mode command in the control panel's Edit menu to set Advanced user mode). Once AppleTalk is inactive, you can use the Chooser to set your printer to the printer port and then print while connected to the Internet. If you were using a Hewlett-Packard DeskWriter 660 or other printer with separate serial and AppleTalk drivers, you would need to use the serial driver in this scenario.

There is at least one situation I can think of that requires having AppleTalk active for making an Internet connection. If your TCP/IP control panel's Connect Via option is set to AppleTalk (MacIP), then AppleTalk must be active to act as a carrier for the Internet's TCP/IP network. In this case the AppleTalk network is probably a LocalTalk network connected to your printer port or possibly an Ethernet port, leaving the modem port free for connecting a nonnetworked printer.

You might find Open Transport easier to use if you compare its egalitarian view of Macintosh networking with the former AppleTalk-dominant view. With Open Transport, AppleTalk is no longer the primary networking protocol. Now AppleTalk and TCP/IP are equal, and you can add other types of networks as equals. You have a separate control panel for configuring each type of network. The AppleTalk control panel configures the AppleTalk network, and the TCP/IP control panel configures the TCP/IP network. Without Open Transport installed, you use the expansively named Network control panel to configure AppleTalk, and the MacTCP control panel to configure TCP/IP.

Unfortunately, much Apple Guide material still reflects the AppleTalk-dominant view of networking, and it may have led you to believe that you had to activate AppleTalk. A user manual is available in Adobe Acrobat format from an Apple Web site, *http://devworld.apple.com/dev/opentransport/docs/Open_Transport_1.1_Manual.pdf*. (If you don't already have the free Acrobat reader, you can download it from *http://www.adobe.com/prodindex/acrobat/readstep.html*.) There's also a lengthy FAQ (frequently asked questions) document, aimed more at network administrators, available in HTML, Word 6, and Acrobat formats at *http://devworld.apple.com/dev/opentransport/overview.html*. These and other more technical documents are summarized with links at *http://devworld.apple.com/ngs/lpp/adrpub/docs/dev/opentransport/reference.html*. By the way, you can read the Acrobat-format manual in your Web browser—using the tip in the opening paragraph on the previous page—if you have Acrobat Reader 3.0 (available at *http://www.adobe.com/prodindex/acrobat/readstep.html*).

ClarisWorks Quick Move

TIP In ClarisWorks 4.0 you can quickly move a block of text to another place in the same document by selecting the source text, scrolling the new location into view, and then ⌘-option-clicking where you want the text to go. This shortcut also works with text in the same text frame of a drawing or the same field of a database, and with selected cells of a spreadsheet. The only limitation is that the destination must be in the same window as the source.

KING CHUNG HUANG
Cochrane, Alberta, Canada

continues

If you knew he could control $6 million in information technology purchases, what would you do about it?

America's schoolchildren. Over 53 million strong. All with the potential to become your customers and employees. But they'll never be able to buy from or work for you unless they understand technology. The answer? Support Tech Corps. A grassroots effort to enhance teaching and learning through technology. And give students the proficiency they need to become the customers and employees you need. Discover the rewards of becoming a Tech Corps Corporate Sponsor.

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America needs to know.

Organizations already providing national sponsorship include:
Cellular Telecommunications Industry Association Foundation (CTIA), Digital Equipment Corporation, and MCI Foundation.

A Launcher Menu

TIP I like to segment my Apple menu into categories such as Applications, Utilities, and Desk Accessories. The problem with this scheme is the time it takes to make aliases and place them in the appropriate categories. Another more efficient way to segment the Apple menu is to place an alias of the Launcher Items folder in the Apple Menu Items folder. In this way, adding aliases to the Apple menu is as simple as dragging the original items to the proper categories in the Launcher window.

ERIC KYLE
Owensboro, Kentucky

See Secrets, Macworld, *December 1996, for a complete treatise on the quickest ways to manage the Launcher in System 7.5.1 and later. Be careful when option-dragging items from the Launcher to the Trash. If you drag across a desktop printer icon, the system may crash.—L.P.*

When Windows Open Unbidden

TIP You have to wait an inordinately long time after inserting some CD-ROMs, such as Marathon 2, while a window opens automatically from the CD-ROM you insert. To keep the window from opening, simply hold down the option key while inserting the CD. The same trick works for other types of removable disks.

DREW SHANKIE
Port Alberni, British Columbia, Canada

Disk Image Relief

TIP Apple often puts software updates on its Web site in the form of disk image files created by its Disk Copy program. For years I have looked for a way to access the files that are encoded in a disk image file without digging out a floppy and waiting and waiting while Disk Copy copies the disk image to a floppy, then waiting while I install from the floppy to my hard drive. And for some reason, any floppies that aren't fresh out of the box fail.

Then I found what I have been waiting for. It's called Disk Image Mounter. For some reason it's supported only for PowerBook users, but it worked great on my Power Mac 8100. When you run it, it asks you to select a disk image file to mount. Then it creates a locked virtual "disk" that appears on your desktop, which you can use as if it were a real floppy disk. You can find Disk Image Mounter by browsing through the Utilities folder in the Apple Software Updates section on *http://www.info.apple.com*, or by using keyword *Applecomputer* on America Online, or *Go Aplsup* or *Aplww* on CompuServe.

PAUL BRUNEAU
Kalamazoo, Michigan

ShrinkWrap 2.0.1 ($20 shareware from Chad Magendanz; a 3-D version is due this spring from Aladdin Systems; 408/761-6200, http://www.aladdinsys.com*) does everything Disk Copy and Disk Image Mounter can do and more, although it's not free.—L.P.*

LaserJet Update

TIP The HP LaserJet 5MP feeds single Quicken checks on the left side of the paper tray, but the LaserJet 5MP driver and various versions of the LaserWriter 8 driver print on the right side of the paper. You can work around this problem with a forms leader (as discussed in *Quick Tips*, January 1997), but switching to LaserWriter driver version 7.1.2 or 7.2 eliminates the need for a forms leader.

JON HARLAN
Kensington, California

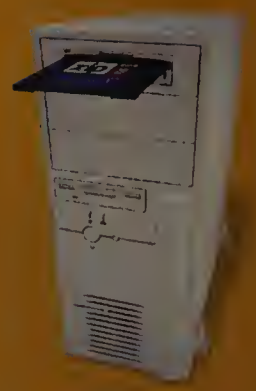
Sticky Clicker

TIP Want sticky menus à la Windows but don't have a multibutton mouse or the AutoMenus Pro shareware (as described in *Quick Tips*, February 1997)? Steve Zellar's free little StickyClick 1.2 extension makes menus sticky when you click in the menu bar. Although StickyClick dates from 1992, it works like a humdinger with System 7.5.5 powered by a PowerPC 604e. It works on every regular menu in all the applications I play with, as well as pop-up menus and hierarchical menus.

HAGEN HOHN
Ottawa, Ontario, Canada

Note that StickyClick could affect other utilities (like PopChar Lite or SignatureQuote) that also rely on user clicks in the menu bar.—L.P.

continues



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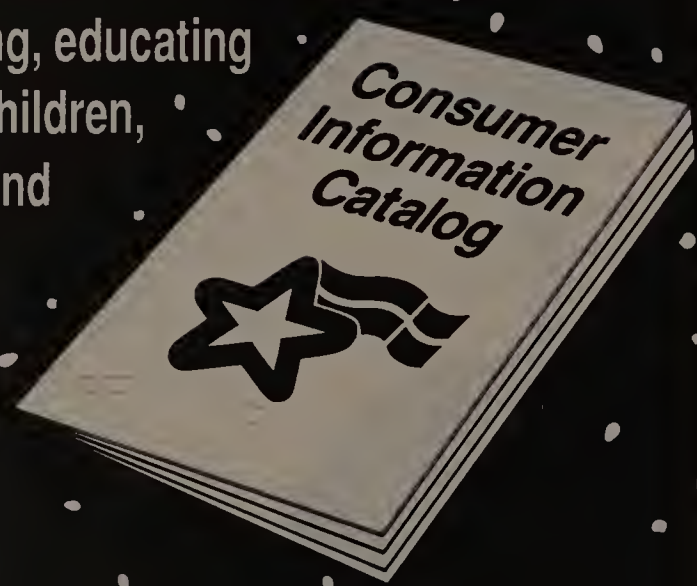

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Soup Up SimpleText

TIP SimpleText doesn't come with a Find command (as noted in *Quick Tips*, February 1997), but you can add one by installing the free SimpleText Color Menu software by Alessandro Levi Montalcini. It adds color text, find and replace, window switching, word counting, page margin settings, and even a single style sheet.

KRISHNA MOHAN
Valsyn North, Trinidad

Working Around Desktop Printing

TIP If you accidentally save a document in a desktop printer, which appears as a folder in a standard Save or Open dialog box, you can still access the document with the Open command of the program that created the document (as mentioned in *Secrets*, January 1997). To remove a file from a desktop printer, drag the desktop printer icon to the Trash, use the Find File accessory to find the file that's saved in the desktop printer, and then drag the trapped file from Find File's Items Found window to the desktop. Find File can't move items out of a desktop printer that's on the desktop.

JAMES GRABER
Buffalo, New York

Jeremy Bohn of Kelowna, British Columbia, Canada, notes that if you just start up with the Desktop Printing extension disabled, your desktop printer turns into a folder again. You can then open it and move or delete a file saved in it. This problem can't happen with Desktop Printing 2.0 and later, which automatically moves a document to the desktop if you try to save it in a desktop printer.—L.P. m

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LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld Mac OS 7.6 Bible*, fourth edition (IDG Books Worldwide, 1997).

Shareware mentioned in *Quick Tips* is available from Macworld Online (*http://www.macworld.com*) or America Online (keyword *Macworld*).

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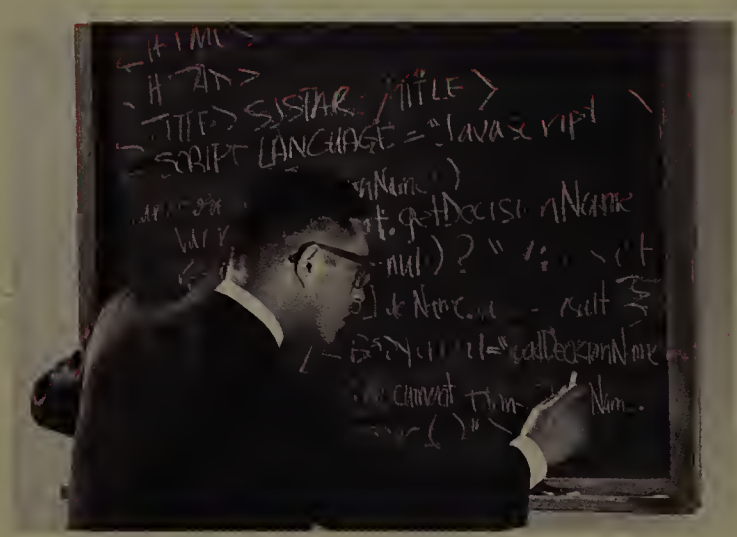

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NetSmart

Surfing Tiny—Are Info-Gadgets Net Smart Yet?

by Cameron Crotty

I have a friend whose idea of fun is to cruise Macy's housewares department in search of yet another kitchen appliance. Cooking with this guy is a laugh riot because he actually *has* a gadget that peels and cores a pineapple while rendering it into inch-wide, five-pointed stars. Specialized appliances practically define the modern way of life, easing our workload by efficiently performing specific tasks. And our love affair with gadgets has not gone unnoticed by the people who sell computers.

Hand in hand with the rise of the Internet, a new class of devices is emerging. These info-gadgets (which include set-top boxes and personal digital assistants) purport to distill the Internet, a large, unmanageable collection of data, into bite-size portions with a machine that's as easy to use as the blender in your kitchen—call it surfing tiny.

Apple (408/996-1010, *http://www.apple.com*) has a huge investment both in the concept of surfing tiny and in the hardware involved. Though not designed specifically for the Internet, the Newton MessagePad works best as a mobile link to other systems, and the Internet is the ultimate medium for such links. On the other hand, the Pippin, Apple's shot at a set-top box, was designed with the Internet in mind. (The Pippin is currently incarnated by Bandai Digital Entertainment [$499 plus $69 for the keyboard; 310/404-1600, *http://www.atworld.net*] as the Pippin @World. Near press time, there was some uncertainty regarding Apple's commitment to Pippin, but Bandai says it will continue development on the Pippin platform.)

So, is either of these specialty devices useful enough to be part of your regular array of tools? Or will they just gather dust in a cabinet like my friend's pineapple slicer?

CHRIS LENSCH

Set-Top Boxes

Forget about Channel Surfing Unfortunately for legions of couch potatoes, scratch the surface of a set-top box and you find a pineapple slicer underneath. Set-tops are being sold on guilt, much the way computers have been sold into the home for the past ten years. The ads show little kids and senior citizens, faces aglow, using said devices to expand their minds or communicate with friends and family. If you don't buy one of these things, you're either impoverishing your child's education or cutting off your elderly parents from much-needed social interaction.

Emotional tweaking aside, the ads lead us to expect a set-top device to be a convenient way to surf the Web and send and receive e-mail. Certainly setup is easy enough—just plug the device into a TV and a phone jack—but set-tops have a long way to go before they can legitimately claim to offer an Internet solution to the couch-bound.

TV-Mail: Viewer Discretion Advised The biggest drawback to set-top Internet access is that there's only one way to make text comfortably legible on a TV—blow up the point size until only three or four words fit on a single line. We're talking eight to ten lines of text on an average TV screen. That's just about room for the first sentence of this paragraph.

Even without the display problems, set-top boxes are crippled by awkward software. Set-tops take you back to the primitive days when you could count your e-mail correspondents on one hand, you had their addresses memorized, and you wrote messages on the digital equivalent of an Underwood manual typewriter. Set-top e-mail addressing is clumsy at best. There are no address-book–management functions; no rules for filtering mail (so no subscribing to Internet mailing lists); and archiving is poor or nonexistent, so forget about rereading that letter from Aunt Agnes six months from now.

They Took the "Vision" Out of Television "So what?" I hear you cry. "Who cares about e-mail, anyway? Every-

continues

Prep Your MessagePad for the Internet

A Newton MessagePad can significantly lighten your traveling weight, but until last year you couldn't establish a dial-up Internet account for the Newton with an ISP. Today version 2.0 of the Newton OS includes Newton Internet Enabler, your software key to the Internet. Further, the MessagePad 2000 and eMate 300 include a new e-mail client called EnRoute. Your task? Wrestle the requisite information from your ISP and enter it. Here's a rough guide to the preference boxes you'll need to visit to enable your MessagePad for the Internet.

GET THE INFO YOU'LL NEED

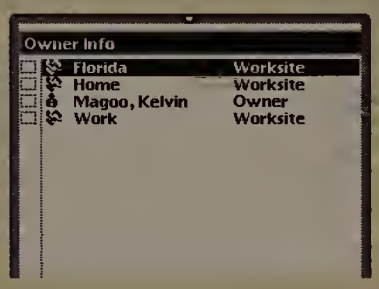
Before you set up your MessagePad, call your ISP and get the following information.

POP (e-mail) Mailbox
- POP user name
- POP password
- POP host name
- SMTP host name

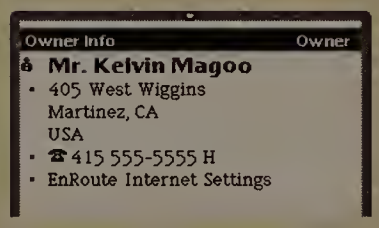
PPP Account
- Local access number for modem
- PPP member/account ID
- Account password
- Name-server IP address
- Name-server domain name
- Gateway IP address (optional)
- Client IP address (optional)
- Log-in script (optional)

FIRST STOP: OWNER INFO

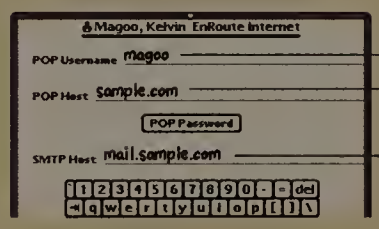
You'll find the Owner Info configuration extension in the MessagePad's Extras drawer.



The Newton will look for your geographical location in your Worksite settings, and for e-mail account information in your Owner files.



In the Owner screen you create an EnRoute Internet setting.

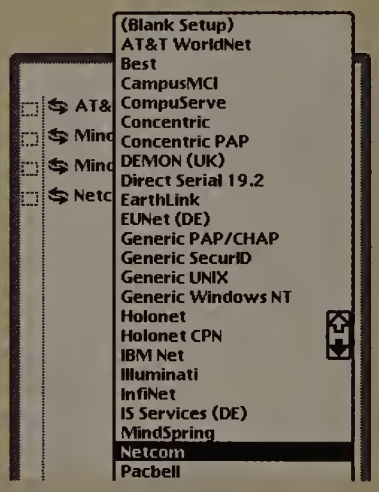


POP user name
POP host name
SMTP host name

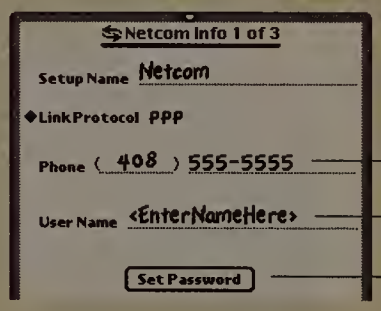
Enter the appropriate names in the subsequent dialog box.

NEXT STOP: INTERNET SETUP

The Internet Setup extension also lives in the Extras drawer. Here, you'll enter the essential information to establish a PPP link to the ISP.

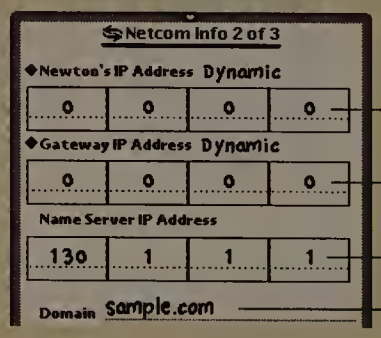


Click on the New button and choose your ISP from the list provided. If you don't see your ISP, then choose (Blank Setup). This choice fills in much of the data the following screens request. **Important note:** Even when Internet Setup fills in the information automatically, you should still confirm the information with your ISP.



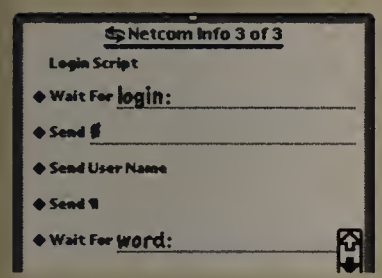
Your access number
Your member ID or account ID (not your POP account name)
Your PPP account password

Some data entry can't be automated. For the first screen, you will have to fill in the information noted above.



Client IP address
Gateway IP address
Name-server IP address
Name-server domain name

For the second screen, most ISPs dynamically assign gateway and client IP addresses. If yours does, your MessagePad's screen will look similar to this one. If not, you must enter these addresses manually.



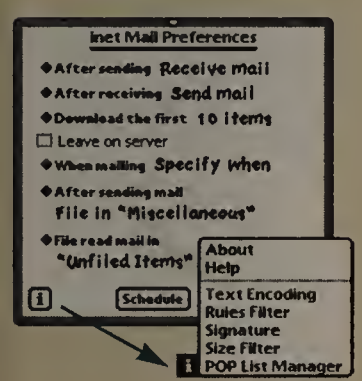
Use the third screen to create any log-in scripts required by your ISP.

LAST STOP: ENROUTE

Now you're ready to send messages. The InOut icon, which resides in the panel in the lower part of the main Newton screen, is your gateway to Apple's new EnRoute e-mail application.

Thanks to the way the Newton OS is built, you can send e-mail just about anytime the little envelope icon appears.

You'll find the major settings for EnRoute in the usual place, under the Newton's signature "little i" menu.



There's a second "little i" menu inside Inet Mail Preferences. Use it to set up rules to filter what mail your Newton downloads, add a signature (.sig) to append to your e-mail, and limit the size of messages that the Newton will download. Don't miss the Schedule button, where you can tell the Newton to check your e-mail regularly.

Road Tips

If you have a national ISP, before you travel, call and request a local POP number for your destination so you can avoid long-distance connection fees. Also ask if you need to change your setup—some ISPs will give you a different name-server address depending on where you are in the United States. Write down all the important information (account number, password, connection numbers, server addresses) *on paper* and take it with you. And before you set one foot outside your door, test everything twice to make sure it works properly.

one knows that the really cool thing about the Internet is the World Wide Web, and it's mostly pictures up there. Plus, that's where I can buy things!"

I hate to burst your bubble, Sparky, but despite the concerted efforts of large multimedia companies, much of the content on the Web remains text-based. And long-term set-top surfing is visually painful. It's also temporally painful, and the setting makes the experience excruciating. Sprawled in front of the TV, remote in hand, I can flick through five or six channels in a ten-second station break. Waiting minutes in silence for a page to download, I suddenly remember all the other things I could be doing.

Set-Top Specifics: @World versus WebTV Despite glaring faults, set-top boxes have their charms. Setting up the @World is dramatically simpler than getting even a Mac up and running, particularly if you're trying to connect that Mac to the Internet. All you really have to do is plug in a few cables and follow the instructions in the registration software, and you're up and running. But despite its simple setup, the @World may be too complex. In addition to surfing the Internet, the @World can run applications, which means it can compete with console game machines like the Sony PlayStation, and perhaps even low-end personal computers. This expanded capability unfortunately results in a device that's too much computer and not enough info-gadget. The @World's expanded mission also hits you right in the pocketbook.

The WebTV Internet Terminal from Sony ($349.95, plus $99.95 for keyboard; 888/772-7669, *http://www.sony.com*) is a better example of a refined appliance. You plug it into your television and phone jack, your main input device is a remote control, and the WebTV is designed solely for e-mail and Web surfing. Those who play video games or write novels are politely invited to use another gadget. While the WebTV isn't as flexible as the Pippin @World, it's much more focused and nowhere near as expensive; I can imagine connecting my grandmother to the family e-mail network with one of these (see a comparison of both products in *Reviews*, and "Bursting the Web TV Bubble" in *News*, in this issue).

If the @World's setup is simple, then the WebTV's setup could be performed by a corpse—there isn't any.

The bottom line is that in their current incarnations as info-gadgets, both the WebTV and the @World force you to give up too much and offer too few benefits to make the trade-off worthwhile.

The Internet in the Palm of Your Hand

The key to successful tiny surfing is deciding exactly what you want to get out of the Net, and then finding an info-gadget that can deliver it. Apple's Newton MessagePad (models range from $500 to $1000) has limitations that make it a poor choice for a number of Internet-related tasks: a small, black-and-white LCD display; not much RAM; no built-in keyboard; and a processor that would be hard-pressed to support the bloated Net-access applications that have become de rigueur on desktop machines. But rather than attempt to shoehorn desktop-style Net access into the MessagePad, an effort that would be doomed to ugly failure, Apple and its third-party developers worked within the confines of the Newton

continues

KEVIN CANDLAND

Seeing Isn't Believing Browse the same Web page on an @World (left), a MessagePad 2000 (center), and a Macintosh (right), and the differences are immediately apparent. To gain legibility, the @World blows up text till just a few lines fit on the screen. But the @World can't magnify pictures or bitmapped text; these become fuzzy blurs. The MessagePad serves up a text-only page that's perfect for a quick informational hit.

platform and turned these "handicaps" into strengths for a specific type of user—the mobile information worker.

Correspondence? But of Course. First, and most important, the MessagePad defines the word *portable*. While laptop reviewers cluck over an extra pound of weight or inch of width, I can slip a MessagePad into the front pocket of my shoulder bag and occasionally forget that it's there. And say good-bye to battery hassles: the four AA batteries in the MessagePad seem to last forever (even through Net sessions), and a full charge is as close as the nearest corner drugstore.

Not having a keyboard further reduces the MessagePad's traveling footprint. In a device designed to reside in the living room or on the desktop, the lack of a keyboard would be a serious flaw. But the Newton operating system is designed to be used with a stylus. If brevity is the soul of your wit, and you have a modicum of precision with your penmanship, then you should have no worries about hitting the road equipped with only a MessagePad and a stylus. The current version of the Newton operating system (2.0) sports handwriting recognition good enough to make scratching out a brief message almost as easy as typing it.

U.S. Robotics sells Graffiti ($79; 408/848-5604, *http://www.usr.com*), which aids text entry by recognizing an alphabet of simplified-stroke characters. However, if your correspondence style is more epic than epigrammatic, you should invest in a keyboard for your Newton. A keyboard increases the hassle factor, but it is light, and you can simplify your life by leaving it at your home base, whether it be the office or a hotel room.

No Time for Graphics To some, surfing the Web from the MessagePad's tiny, monochrome screen might seem like an exercise in frustration. But when you consider the amount of time that you typically spend downloading all those goofy graphics and animations, directed, text-only surfing can be more than just an acceptable compromise—it can be a real time-saver. All-Pen Software's NetHopper ($49.95; 408/399-8800, *http://www.allpen.com*) Web browser (which comes preinstalled on the MessagePad 2000) can be set to skip downloading images from Web sites.

This solution is ideal for, say, sales reps on the road who need to download prices from the company's Web site or check the latest business headlines. NetHopper also handles HTML forms, making it easy to request stock quotes or get database information from your company's Web server.

Perhaps the MessagePad's greatest advantage as an Internet appliance is that it boasts an OS designed from the ground up to organize and access information. For example, e-mail features are a part of the Newton operating system, so they're available from nearly any application. Furthermore, you can use the listings in your Names application to address all your mail easily, rather than keeping two or three separate lists for each application you use.

If you travel extensively, frequently use e-mail, and occasionally surf the Web, the MessagePad is an Internet appliance you could fall in love with.

Where Do You Want to Go Today?

A desktop computer is both a powerful and a perplexing tool. Since what it is depends entirely on what kind of software is loaded into it, you must decide what your computer will be. An information appliance, on the other hand, should be like a toaster or a microwave oven: designed for a specific, obvious purpose. It should be easy to tell whether or not you need one.

Given that definition, the tiny surfboards available today barely qualify as information appliances. But hey, the revolution is young. No doubt you'll soon define your Internet connection by the hardware you buy. You'll know exactly what you want to do with the Internet, and you'll purchase a device whose form and function allow you to do just that. Of course, the question remains, are we ready for the Ginsu Web2000? **m**

CAMERON CROTTY (*cameron@www.macworld.com*) covers the Internet for *Macworld* and is secretly quite fond of the occasional trip through Macy's housewares department.

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After Effects Secrets

MAXIMIZING THE ULTIMATE MOTION-GRAPHICS MACHINE

by Jim Heid

Couch potatoes like eye candy, and Adobe After Effects is the ultimate chocolate factory. After Effects creates the kinds of video effects that once required six- and seven-figure dedicated workstations (see *Reviews, Macworld*, March 1996). You can layer video clips and still images, dynamically resize them, make them spin and twirl, and apply a dazzling array of filters and effects—all on the same computer you use to play Myst.

After Effects is laden with nooks and crannies, and this month, thanks to the expertise of Adobe Systems trainer Erica Schisler, I explore some of them. I assume you have a working familiarity with After Effects; if not, you might want to grab a copy of the excellent *Adobe After Effects for Macintosh Classroom in a Book* (Adobe Press, 1996; $50). For more information, visit *http://www.heidsite.com*.

See After Effects Run

After Effects must perform calculations on millions of pixels for each frame of a project. It's one of the most Mac-taxing programs available. Sometimes I think the program should be named After Dinner, since that's when you might see the results of a complex render. Here are some performance-optimizing tips.

Close Those Windows When rendering a composition, close every window except for the Render window. The Composition window, where previews appear, is the single biggest CPU hog.

Drop That Resolution When you need only a rough preview, use the Composition menu's Resolution submenu to specify a lower resolution, such as Half or Third. To eliminate some of the low-res jaggies, zoom out in the Composition window. Things look best if you match the zoom scale to the resolution—for instance, for half resolution choose 1:2 from the Composition window's magnification pop-up menu.

Lock Those Caps Making several changes to a clip's settings? Press the caps lock key to freeze the Composition window and keep After Effects from rendering each change. Press caps lock again to render all the changes at once.

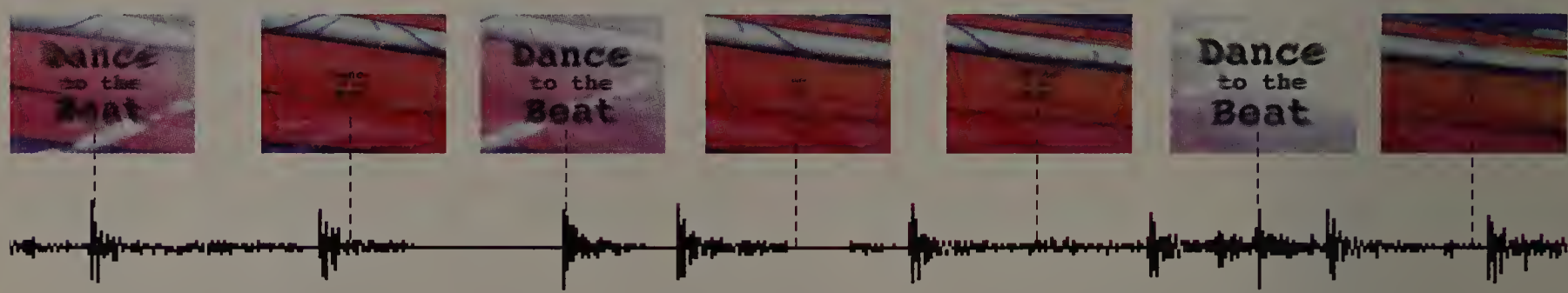
Filter Those Stills Say your composition contains a still image, perhaps a background, to which you want to apply a static (not animated) filter. If you simply apply the filter, After Effects performs the same calculation over and over

continues

DIANE FENSTER

After Effects Makes Clips Dance

In this After Effects project, a slogan appears atop a moving background, continually resizing in sync with an audio track. The seven frames below show what the animation looks like at selected points in the sound track. As the volume increases (the wave's amplitude gets bigger), the text grows larger; as the audio gets softer (the wave's amplitude gets smaller), the text shrinks.



again, applying the filter as it renders every frame. To avoid that performance hit: apply the filter to the still and export one frame as a PICT image (use the File command in the Composition menu's Save Frame As submenu). Now replace the original still with the filtered PICT. The effect is a permanent part of the image, no calculation required. Or you can apply the filter in Adobe Photoshop and import the result into After Effects. You must take this route if the image is larger than the After Effects frame size.

Unlocking Keyframes Keyframes are the key to After Effects' ability to animate filters and footage. When you fly a clip across the screen or animate a filter, you're working with keyframes. Here's how to make them work harder.

Copying and Pasting Keyframes Once you've created a complex set of keyframes, you can apply them to other footage in the same project or in a different one. Say you've got keyframes that change the location property of a beach ball clip to make it bounce, and you'd like to apply that behavior to a basketball clip, too. In the Time Layout window, select the property whose keyframes you want to copy. Choose Copy from the Edit menu. Finally, in the Time Layout window, locate the clip to which you want to apply the behavior, select the same property, and choose Paste.

A variation on this theme involves the Duplicate command. Say you've set up keyframes to spin the beach ball clip once. To spin it twice, select the property containing the keyframes and press 1-D. Now drag the duplicated keyframes in the timeline so that they start where the previous set leaves off.

Keyframes and . . . Excel? When you copy a set of keyframes to the Clipboard, you copy numeric values describing each keyframe's settings. You can paste these numbers into a spreadsheet program, modify them using formulas, and then paste the results back into After Effects. It's a great way to apply precise changes—say to slow a clip's movement by 20 percent—without manually editing the keyframes. (And by the way, you can create a library of keyframes by pasting them into the Mac's Scrapbook.)

Assistance Offered After Effects includes a variety of assistants, for automating the creation of keyframes. The After Effects Production Bundle includes one called Motion Math, which provides a scripting language for calculating keyframe values. (The Production Bundle is the extra-featured, $1995 version of After Effects; upgrades from the $995 base version cost $1295.)

You don't fancy yourself a programmer? Don't panic. Motion Math includes 13 canned scripts that perform motion magic—causing a clip to blink, simulating the pull of gravity, resizing all layers in a composition, and more. My favorite, Comp Audio, lets you alter a filter setting according to the volume of an audio track.

Family Ties

When it acquired After Effects from the Company of Science and Art, one of the first things Adobe did was enhance the program's ties to other Adobe products.

Rasterizing Illustrator Files After Effects works wonders with Adobe Illustrator files. Not only can it rasterize them—convert them from their PostScript curves into bitmaps—it can do so continuously. But using the Continuously Rasterize option increases the amount of time and memory required to render a composition. When you're just previewing, leave the option off. If After Effects doesn't have enough memory to rasterize the file correctly, quit and use the Finder's Get Info command to boost After Effects' memory allocation.

Importing Photoshop Layers After Effects can import a multiple-layer Photoshop file and retain the layering information. From the File menu's Import submenu, choose Photoshop 3.0 As Comp, locate the file, and import. Each layer becomes a separate footage item. Tip: Photoshop allows you to use the same name for multiple layers, but After Effects organizes layers by name; give each layer a unique name in Photoshop before importing the file.

Applying Photoshop Filters After Effects can use Photoshop-format filters. Open the Photoshop Plug-ins folder, make aliases of the filters you want, and copy those aliases to the After Effects Plug-ins folder. There's a growing family of third-party plug-ins designed specifically for After Effects. You'll find details on them in "Video Tools' Top Stars," elsewhere in this issue. Between these effects and those built into After Effects, you can make enough eye candy to satisfy the most voracious visual sweet tooth. **m**

Contributing editor JIM HEID used After Effects to produce the QuickTime movies that accompany his *Macworld New Complete Mac Handbook* (IDG Books Worldwide, 1995).

Timeline Tips

Forget which switch a particular letter represents in the Time Layout Window? Click beneath the letter and hold down the mouse button; a descriptive phrase replaces the letter. To expand and collapse a layer's properties, press the grave accent key (`). To expand all of a layer's properties, press 1-`. You can also display individual layer properties by pressing a single key; see the quick reference card that accompanies After Effects.

Dancing Lessons: Illustrator Meets Motion Math

The pulsating slogan at left was created in Adobe After Effects. The project continuously rasterizes Adobe Illustrator art and uses the Motion Math command (available in the After Effects Production Bundle) to resize a clip in sync with changes in sound level in an accompanying audio track. You can download a QuickTime movie of this project from *http://www.heidsite.com*.

Create an Illustrator File

Your first step is to create a block of text in Illustrator. Tip: If you'll be moving the Illustrator file to a computer that doesn't have the font you've chosen, use Illustrator's Make Outlines command to convert the text into outlines before saving.

Apply the Motion Math Command

My favorite Motion Math script is Comp Audio, which lets you tie a piece of footage to an audio track so that the footage's characteristics—its size, rotation, whatever—change in concert with the audio's amplitude. You can also apply Comp Audio to filters.

1. After importing and positioning the composition's elements, select the Illustrator element and choose Motion Math from the Layer menu's Keyframe Assistant submenu.

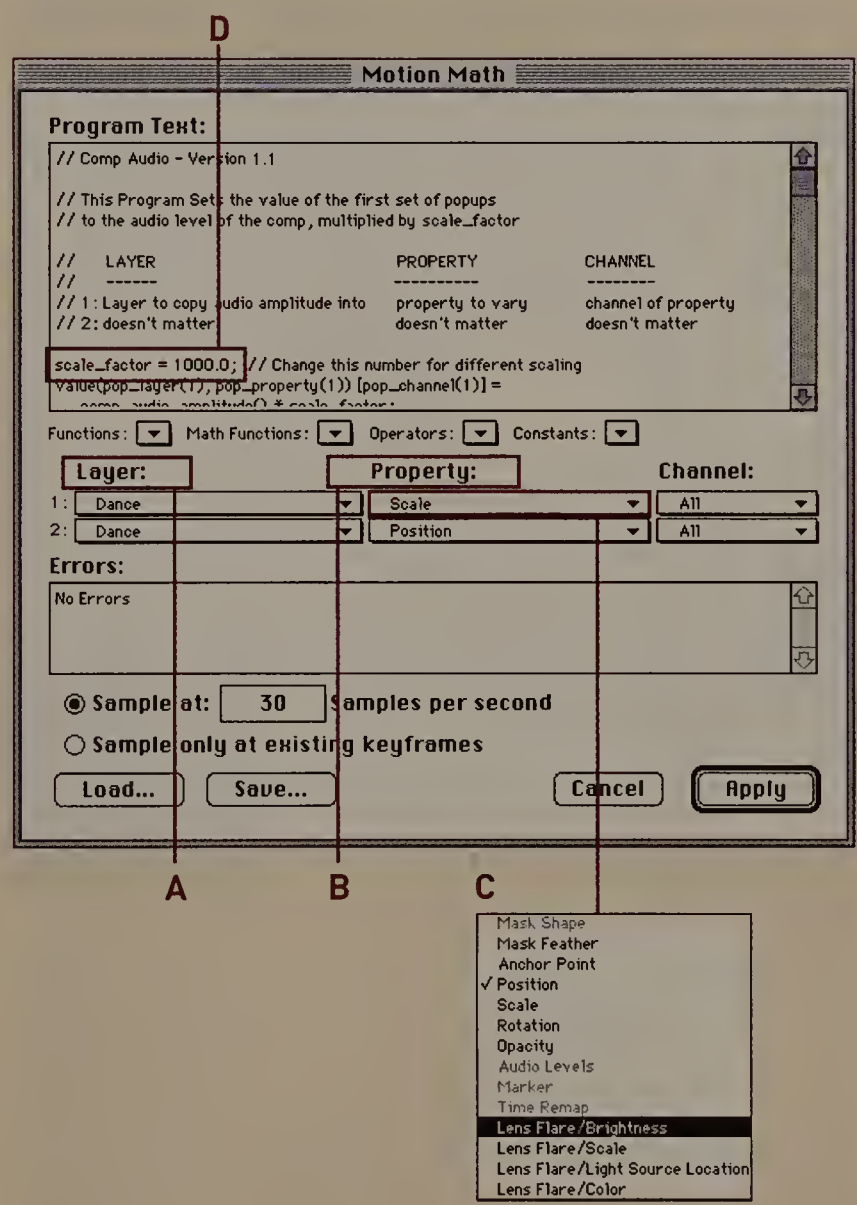
2. Within the Motion Math dialog box, click on the Load button. Locate the Sample Motion Math Scripts folder, open it, and double-click on the script named comp audio.mm. The script will appear in the Program Text box.

A. Choose the layer you want to affect.

B. Choose the property you want to alter based on the audio track's sound level.

C. You can also apply Motion Math to filter and effect settings. In this example, the loudness of the audio track controls the brightness of the Lens Flare filter.

D. Tip: To apply a different degree of scaling, change the value labeled scale_factor.



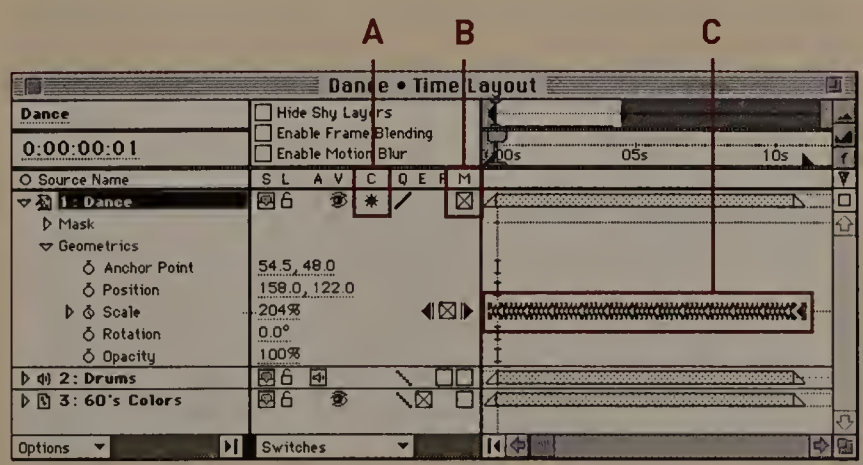
Configure the Time Layout Window

Most keyframe and layer adjustments take place in After Effects' Time Layout window. The single-letter headings represent various controls, called switches, including motion blur and continuous rasterization.

A. To activate continuous rasterization, click on the tiny dotted circle beneath the letter *C* (it changes to a star). After Effects will rasterize the Illustrator text as its size changes.

B. To activate motion blur, check the box beneath the letter *M*. After Effects will generate a blurring effect as the text grows larger and smaller.

C. Each diamond represents a keyframe generated by the Motion Math command.



Publishing Workshop

Duotones, Tritones, and Quadtones

by David Blatner

You've probably seen the results of misused duotones: garish photos saturated with ink, usually black and a second color. Duotones (or tritones or quadtones, collectively called *multitones*) are basically neutral (gray-scale) images printed with more than one color (duotones use two inks; tritones, three; and so on). What many designers fail to understand is that multitones work best not to colorize pictures but to enhance gray-scale images—make them pop off the page.

A Range of Tones

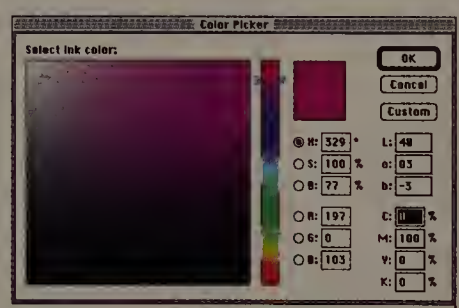
A PostScript printer, using just black ink or toner, can output gray-scale images with up to 256 levels of gray. That's typically enough to maintain smooth transitions and sharp details. However, printing presses generally cannot hold that many levels using a single color of ink, so when that same image comes off press it may contain only 60 or 70 levels of gray. Usually image details and subtle transitions suffer.

Traditionally, printers have coaxed more gray levels, more detail, and more depth out of printed images by printing the same image with more than one ink. For example, a printer might use light gray to print the highlight areas of a picture, medium gray to print the midtones, and black for the shadows. If each ink results in 70 levels of gray, then the image ends up retaining lots of

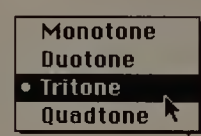
Making Multitones in Photoshop

SOME PEOPLE MAKE multitone images by converting a gray-scale image into CMYK mode and then adding color; Adobe Photoshop makes it even easier for you.

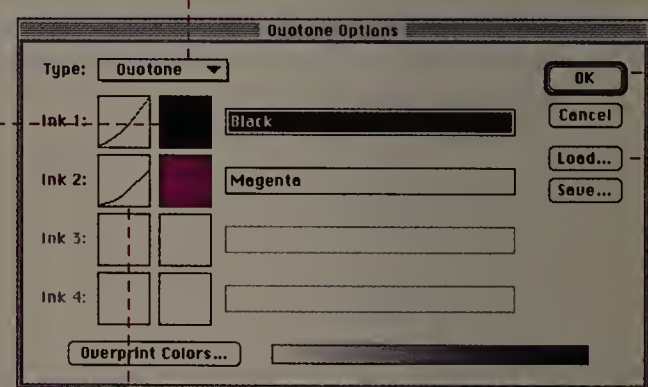
The Duotone Options dialog box is your base of operations for creating multitone images. Start by selecting Duotone from the Mode menu. The image must already be in Grayscale mode for you to do this. (Mode is under the Image menu in Photoshop 4.)



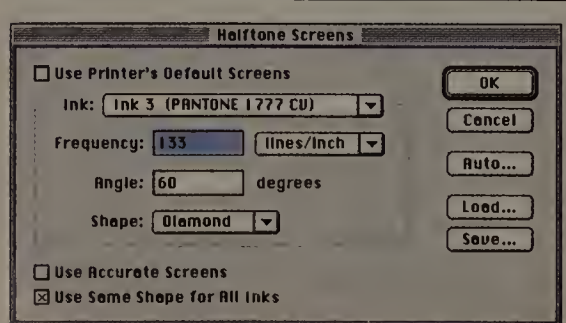
Clicking on the ink color icon brings up the Color Picker. It's best not to veer from the preset too much, however, or you may oversaturate the image. Also, remember to pick colors from a color swatch book rather than the screen—unless you've done a great job calibrating your monitor, you probably can't trust what you see on screen.



To create a multitone image, select Duotone, Tritone, or Quadtone from the Type pop-up menu.



Printing Duotones



AFTER BUILDING a multitone image, you have to save it as an EPS image in order to get PageMaker or QuarkXPress to print it properly. Photoshop saves multitone EPS images in a very compact form: it saves the gray-scale image, plus curves for each additional color (so the file size isn't significantly bigger than the original gray-scale).

One key factor in printing duotones is using the proper halftone screen angles (to avoid moiré patterning). As long as the screen angles are 30 or 45 degrees apart, you should have no trouble. For duotones, 30 and 75 degrees is pretty safe. You can control screen angles either in Photoshop's Page Setup dialog box or within the page-layout application.

details that would have been lost if only one ink had been used. This means you've expanded the tonal range of the image (for an example, compare the original gray-scale image with the neutral process-color version in "Color Your World"). Multitone images let you do the same thing digitally, by adding various inks in the tonal areas where you want them.

Color Adds Feeling

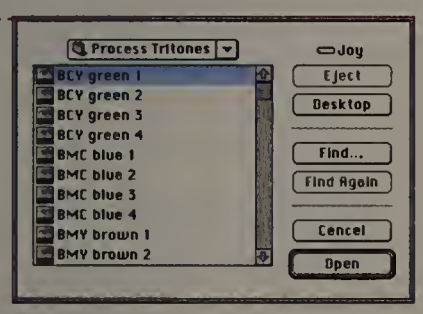
Instead of printing additional colors with grays, you can start to add warm or cool color tones to the gray-scale image by using spot or process colors. If you use a light blue in the highlight and midtone areas, the image takes on a cool feel. Reds and oranges give your image a much warmer tone. When adding color in this way, keep in mind that you're trying to add depth and tone to an image, not just colorize it.

The Power of Duotones

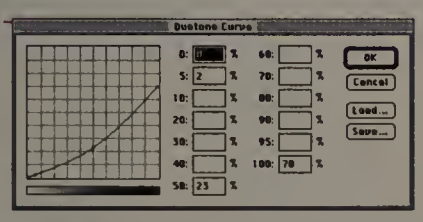
Perhaps you produce a black-and-white newsletter and your printer offers to add a second color cheaply. Or perhaps you want to reproduce a gray-scale image in a four-color piece. No matter what colors you add, you can usually get richer-looking images by converting them into duotones. But remember that there is great power in subtlety; you don't need to go hog-wild to get a great effect. **m**

DAVID BLATNER is coauthor of *Real World Photoshop* (1996) and *The QuarkXPress Book 94* (1994), both from Peachpit Press. You can reach him at *david@moo.com*.

Press OK at any stage of the operation to see how the image looks (remember that the final printed image may look different from what you see on screen). If you want to adjust the image, select Duotone from the Mode menu again. (Unlike many other adjustments in Photoshop, changes made in the Duotone Options dialog box don't degrade the image, so you can go back and adjust it as many times as you want.)

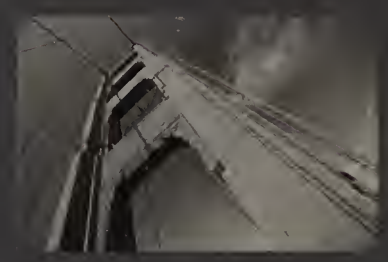


Press Load to select one of Photoshop's preset curves. These make a good starting place for adjusting images. Many of the presets come in groups of four: the first gives the image the most color; the fourth affects the image the least.



Clicking on the curve icon brings up the dialog where you can edit the curve. Don't adjust the curves radically; you'll oversaturate the image.

Color Your World



Original Gray-scale Image

Quick 'n' Dirty Duotones

You can fake duotones in a page-layout program. Lay a flat tint behind a gray-scale image; set the picture to overprint the tint. You won't enhance the image, but you will add color and feeling.

Fake Duotone The magenta plate is just a flat tint. The image of the bridge is visible in the black plate only.

Real Duotone In this true duotone, lighter and darker pixels make the bridge image visible in the magenta plate, too.

Warm and Cool Images

You can change the feel of a gray-scale image by making it a multitone image. The colors you choose determine the feeling.

Warm This tritone combines magenta, yellow, and black.

Cool This duotone combines cyan and black.

Neutral Colors

Mix equal amounts of cyan, yellow, and magenta, and you get gray (actually, inks aren't pure, so you often need to use slightly more cyan and add some black). A neutral quadtone image is richer in tone than a gray-scale image using just black ink.

In close view of a quadtone, all gray levels are four-color rosettes.

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Graphics Workshop

Creating Multiple-Object Blends in FreeHand 7

by Cathy Abes

ARTIST Arne Hurty, who spent eight years as *Macworld*'s informational graphics designer, recently became the design director for Macworld Online and engineered a major redesign of the *Macworld* Web site. A fervent Macromedia FreeHand user since the program's inception, Hurty won the first FreeHand Illustration Award in 1987.

HOW IT WAS DONE One of FreeHand 7's most useful new features is its ability to quickly and easily create complex multiple-object blends—which for Hurty has eliminated much time and drudgery.

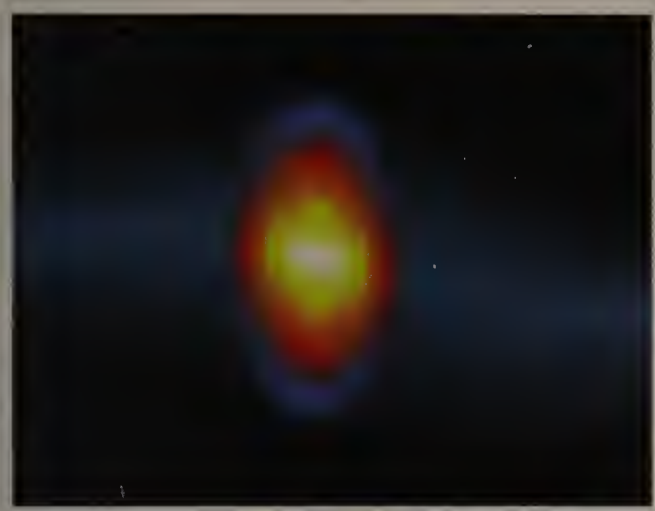
In this illustration created originally for *Popular Mechanics*, showing a meteor being blown up in a nuclear explosion, Hurty wanted to convey a sense of depth in space. To achieve that effect, he created a multiobject blend; that let him create a background object with blended colors that themselves blend smoothly to objects in the foreground. The trick is to blend the edges of the object into a background that also has a blend—resulting in a more subtle and realistic look than can be achieved with a blend from one solid color to another.

Building complex blends in previous versions of FreeHand required many more objects and blends. This blend, which would have required about 20 minutes using 14 objects in FreeHand 5.5, took Hurty about 5 minutes using only 4 objects in FreeHand 7.0.

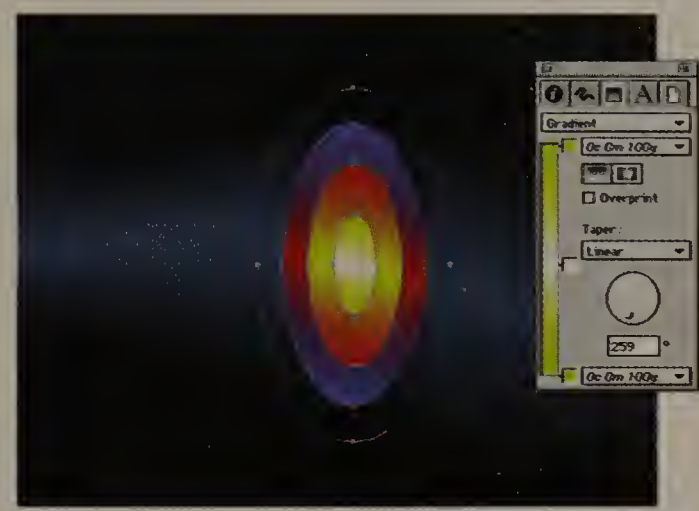
TOOLS **Hardware:** Power Mac 6110 with 24MB of RAM and 250MB internal hard drive; 14-inch Sony HD monitor. **Software:** Macromedia FreeHand 7.0. m

1 The keyline view of the background shows a simple two-object fill.

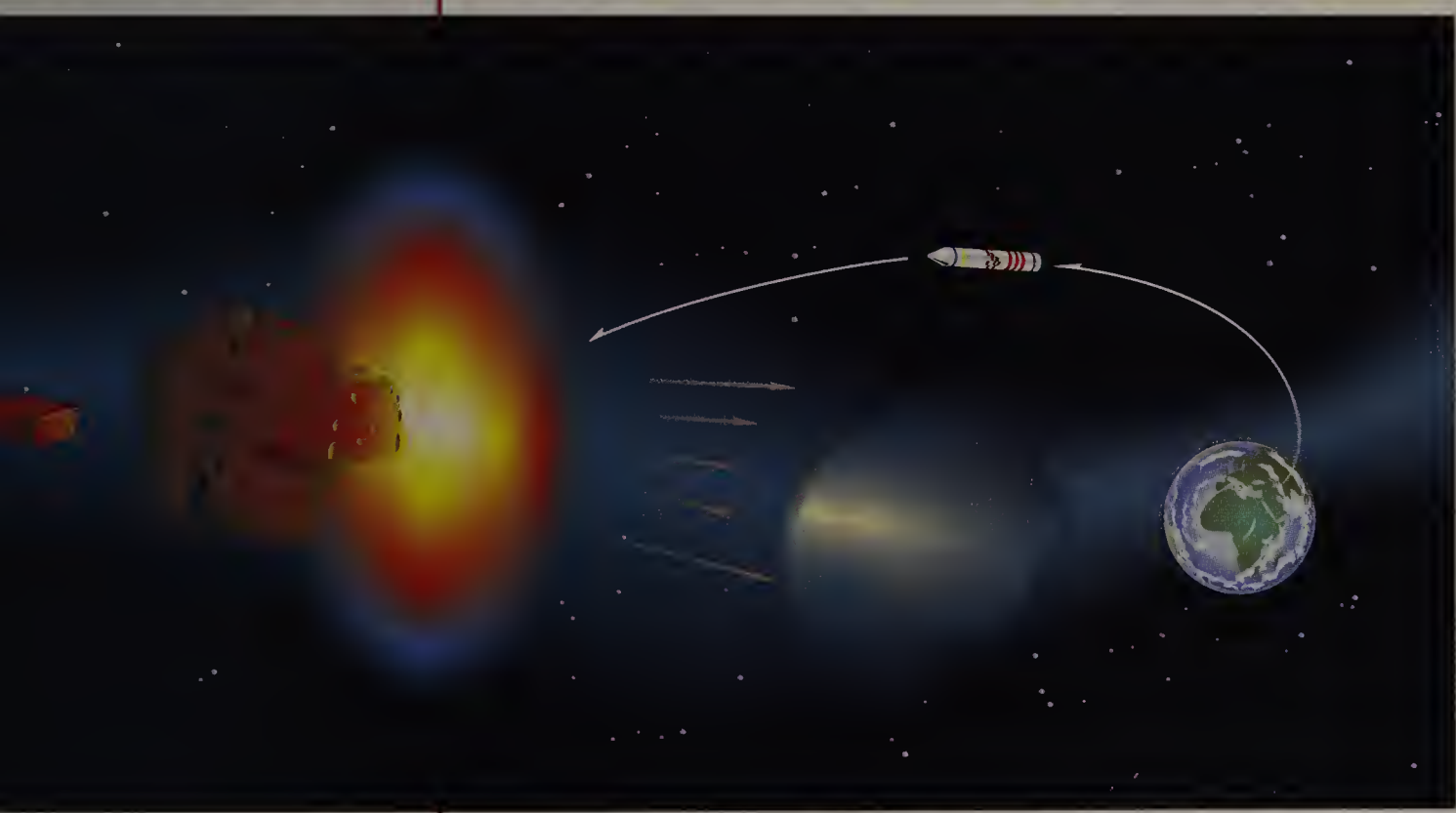
2 The preview mode of the background fill, with colors gradating from blue-black (deep space) to a somewhat lighter blue (dark sea).



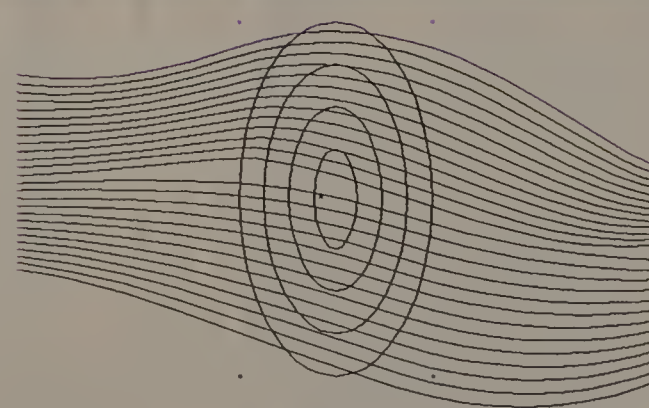
6 After selecting all four ellipses, Hurty used the Blend command to create a multiobject blend between them to achieve the final effect.



5 Hurty assigned a different multicolor fill to each of the interior ellipses. The center ellipse blends from yellow at top and bottom to white in the middle; the next one out blends from red at top and bottom to yellow in the middle; the third ellipse blends from lighter blue at top and bottom to red in the middle.



3 The first step in creating the blend for the explosion was to draw the outermost ellipse, with a multicolor fill gradating from blue-black at the top and bottom to a lighter blue in the middle. Hurty positioned the ellipse so that its gradations closely matched and aligned with those of the background, making the two objects appear to blend into each other.



4 He added three more objects to make four concentric ellipses, shown in keyline view, that together would represent the nuclear explosion.

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143	Iomega	77	888/2IOMEGA
167	J & R Computerworld	282	800/221-8180
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186	L.A.Trade	—	800/433-3726
98,99	LA CIE	52	800/999-1332
12	Linotype-Hell	17	800/842-9721
190	Mac Bargains	71	80/619-9091
187	MacAcademy	106	800/527-1914
192,193	MacConnection	145	800/800-3333
168,169	MacMall	131	800/222-2808
170,171	MacMarket	258	800/223-4622
91	MacPlay	159	800/4-MacPlay
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81	MacSoft	30	800/229-2714
188,189	MacWarehouse	150	—
151	Macworld Expo	—	800/645-EXPO
182	MegaHaus	245	800/786-1184
9	MetaTools, Inc.	5	800/472-9025
20	Microspot USA, Inc.	3	800/622-7568
55	Microtek Lab, inc.	105	800-654-4160
66	Mitsubishi Electronics America	261	800/937-2094
6,7	Motorola Computer Group	207	800/759-1107
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198	PowerTools	63	800/891-4307
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145	Ricoh	4	—
162	Seybold- New York	—	800/488-2883
152	Seybold- Online	—	800/488-2883
83	Sony Corporation	—	800/472-SONYID1
146	Symantec	—	800/695-0679
57	Tektronix	143	800/835-6100
176,177	The Mac Zone	70	800/436-0606
28,29	Umax Computer	99	800/859-2728
16,17	ViewSonic	59	800/888-8583
80	VST Technologies, Inc.	73	508/263-9700
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73	Xante Corporation	112	800/926-8839
2,3	Xerox Corporation	100	—

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1 dial 503.684.5370 Fax In Card

Simply fill in the questionnaire, circle the reader service numbers that correspond to the vendors you would like information from, then fax your form to us at 503.684.5370. FREE product information will be sent to you directly from vendors.

2 postage pre-paid Mail In Card

After filling in the questionnaire, circle the reader service numbers that correspond to the vendors you would like information from, then just drop the postcard in the mail. Vendors will send FREE product information directly to you.

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PLEASE ANSWER THESE QUESTIONS, CHECK ALL ANSWERS THAT APPLY

1a. For which of the following Mac-related products do you specify, recommend, approve, purchase or influence the purchase?

1b. Which of the following do you plan to purchase in the next 12 months? (Check all that apply.)

	Purchase Involvement		Plan to Buy
Desktops/PowerBooks	◯	1	◯
Monitors	◯	2	◯
Printers	◯	3	◯
Storage Devices	◯	4	◯
Networking/Data Communications	◯	5	◯
Internet/Intranet products/services	◯	6	◯
Software: business/productivity	◯	7	◯
graphics/design	◯	8	◯
interactive publishing/ multimedia	◯	9	◯
entertainment	◯	10	◯
education	◯	11	◯
other software	◯	12	◯
Any other products	◯	13	◯

2. Are you employed, and involved in purchase decisions for 5 or more Macs? ◯ Yes (1) ◯ No (2)

3. What's Your Opinion?
What are your main frustrations in making Mac-related purchase decisions?

- ◯ 1. Lack of expertise in assessing products
- ◯ 2. Difficulty in installing or using products
- ◯ 3. Too many choices
- ◯ 4. Not enough choices
- ◯ 5. Unclear needs
- ◯ 6. Concern that cheaper, better products are about to come out
- ◯ 7. Other (please specify) _____

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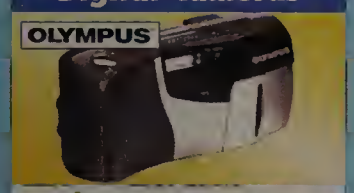
Digital Cameras

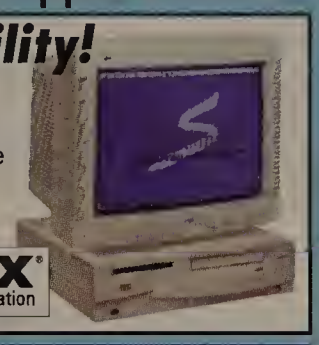


Olympus D-200L
Digital Camera
•No film necessary •2MB internal flash RAM •Stores 20 images at 640 x 480 resolution (24-bit color)
$599.99 (OLM D200L)

Casio QV120
(CAS QV120) $499.99
Casio QV300
(CAS QV300) $679.99
Olympus D-300L
(OLM D300L) $899.99

SuperMac Power and Expandability!

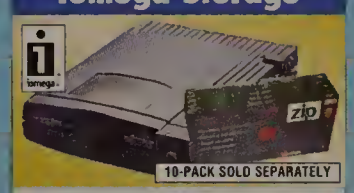
C500 160MHz Desktop Computer
•Affordable and easy-to-use •603e PowerPC™ processor
•16MB RAM, expandable to 144MB •1.2-gigabyte hard drive
•8X-speed CD-ROM drive •1MB video memory •Speakers and microphone •Slim design •Monitor sold separately



$1149.99 after $50 mail-in rebate
(UMX C51601618) (HURRY! rebate offer good until 4/15/97)

UMAX Computer Corporation

Iomega Storage



100MB Zip™ Drive
•Unlimited storage an inexpensive 100MB disks •Easy play & plug setup to SCSI connector •29ms access time •Includes one cartridge
$199.99 (BER ZIP100SCSI)

Spare 100MB Zip Cartridge
(BER MAC100MBDSK) $19.99
Zip 100MB Cartridge 3-Pack
(BER MAC100MBTRI) $49.99
Zip 100MB Cartridge 10-Pack
(BER MAC100MBTEN) $129.99

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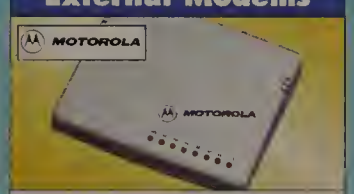
Hewlett-Packard
DeskWriter 600
•600 x 600 dpi •Add color with the optional, low-cost HP color kit •Prints on a variety of paper types with ease, including envelopes and postcards •AppleTalk interface
$169.99 (HP C2185A)

DeskWriter 340CM
(includes Color Kit and Mac adapter)
(HP C2663A) $299.99
DeskJet 1600CM (for Mac/PC/Ethernet)
(HP C3541A) $1999.99

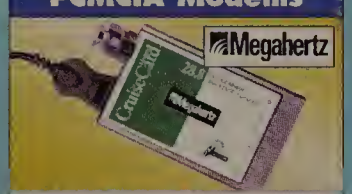
External Modems



Motorola
28.8 ModemSURFR
•28.8 K/14.4K bps data/fax
•Transmission up to 115.2K bps
$69.99 after $50 mfr. rebate
(MOT MAC288SURF) *(rebate expires 5/31/97)*

ZOOM V34X Plus (33.6)
(ZOP 2836) $109.99
SupraExpress 336E (33.6, speakerphone)
(SRA XPR336EMAC) $139.99
Global Village TelePort (33.6, speakerphone)
(GLV TELEPORT336) $249.99

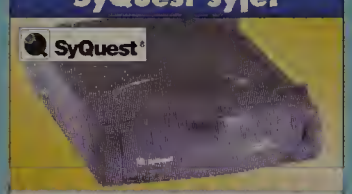
PCMCIA Modems



Megahertz
CruiseCard XJA3288
28.8 Fax/Modem w/XJack
•For PowerBooks with PCMCIA slots •Direct connection to many cellular phones with optional cable
$219.99 (MHZ XJA3288)

Motorola 33.6 Montana
(MOT PC336MONTMAC) $249.99
Global Village PowerPort Platinum (28.8/14.4)
(GLV PCMCIAPLTNM) $269.99

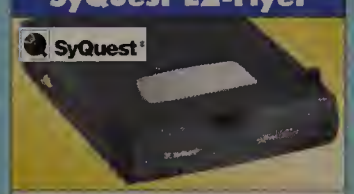
SyQuest syjet



SyQuest syjet 1.5GB
External Hard Drive with Removable Disk Cartridge
•1.5GB capacity per cartridge for virtually limitless, flexible storage
$499.99 (SYQ SYJET1SE-09)

SyQuest 1.5GB Cartridge (Formatted)
(SYQ SYJET-005) $124.99
SyQuest 1.5GB 3-Pack (Formatted)
(SYQ SYJET-006) $319.99
SyQuest 1.5GB 5-Pack (Formatted)
(SYQ SYJET-007) $519.99

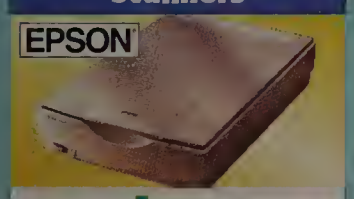
SyQuest EZ-Flyer



SyQuest EZ230
EZ-Flyer Removable 230MB SCSI Drive
•13.5ms access; 2.4MB/sec. data
•Includes one cartridge, SCSI cable
$294.99 (SYQ EZ230EXTMAC)

SyQuest 230MB 3-Pack (Formatted)
(SYQ 230MB3PKMAC) $79.99
SyQuest 230MB 5-Pack (Formatted)
(SYQ 230MB5PKMAC) $124.99
SyQuest 230MB 10-Pack (Formatted)
(SYQ 230MB10PKMC) $239.99

Scanners



Epson
ActionScanning System II
•Scans over 16 million colors •Text Enhancement Technology •Compact size •TruePass™ scanning technology
$369.99 (EPS ACTIONIIMAC)

Visioneer PaperPortVX Mac-SCSI
(VIR PAPVXMAC-SC) $279.99
Nikon ScanTouch AX110
(NKN AX110-MAC) $299.99
UMAX Vista-S12 (with Photoshop LE)
(UMX VS12MACLE2) $649.99

Keyboards

KINESIS
Essential Macintosh/PC Convertible Keyboard
•Concave alphanumeric keywells •Integrated padded palm rest
$179.99 (KSS K8132MPC)

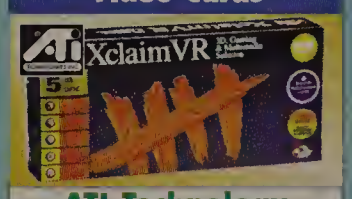
Kinesis Foot Switch (mouse functions)
(KSS AC005FS) $19.99
PC Concepts MAC Replacement Kybd.
(PON 61530) $39.99
PC Concepts MAC™ WAVE Keyboard
(PON 61500) $59.99

Carry Cases

Targus
Black Notepac Plus
•PowerBook case has zip-down workstation and expanding file
$59.99 (TAR CNP1)

Targus CN01 black Notepac case
(TAR CN01) $34.99
Targus CLC1 black leather Backpack
(TAR CLC1) $89.99
Targus CP01 notebook catalog case
(TAR CP01) $119.99

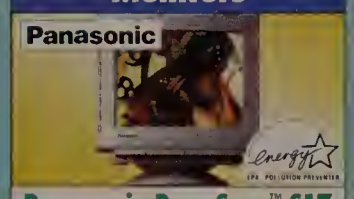
Video Cards



ATI Technology
4MB PCI Video Graphics Card
•Turns PCM Mac into a multimedia engine •Supports 1152 x 870 res
$299.99 (ATI 4MBXCLAIMVR)

Radius Precision Color 8/1600
(RAD PRECLR81600) $349.99
Truevision Bravado 1000
(TRU BRAVADOMAC) $579.99
miroMOTIONDC20 Pro Video Editor
(MRO MOTIONDC20) $699.99

Monitors



Panasonic PanaSync™ S17
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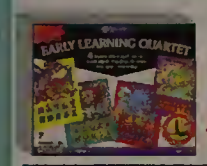

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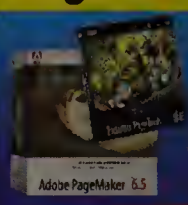

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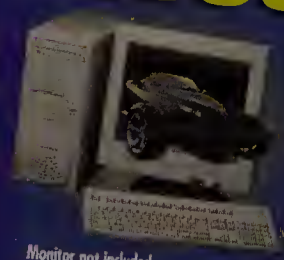

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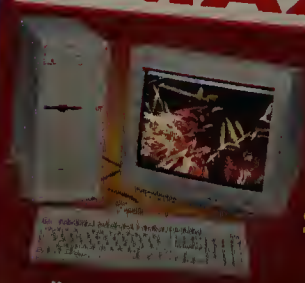

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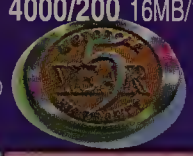

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2.0GB	Satum	8.5ms	-	Fast SCSI 2	425	485
2.0GB	Atlas	8ms	-	Fast SCSI 2	495	565
2.0GB	Atlas	8ms	11.0 MB/Sec.	F&W SCSI 2	555	630
4.5GB	Atlas II	7.9ms	-	Ultra SCSI 3	875	930
4.5GB	Atlas II	7.9ms	12.5 MB/Sec.	F&W Ultra SCSI 3	895	975
9.1GB	Atlas II	7.9ms	-	Ultra SCSI 3	1595	1655
9.1GB	Atlas II	7.9ms	12.7 MB/Sec.	F&W Ultra SCSI 3	1645	1695

VALUE DRIVES from Quantum

365MB	Quantum	10ms	-	Fast SCSI 2	155	215
535MB	Quantum	9ms	(5400RPM,512K Buffer)	Fast SCSI 2	N/A	229
1280MB	Fireball TM	10.ms	-	Ultra SCSI 3	245	315
2.1GB	Fireball TM	10.5ms	-	Ultra SCSI 3	275	335
3.2GB	Fireball TM	10.5ms	-	Ultra SCSI 3	375	435

All Value Drives are 4500 RPM, 128K Buffer with a 3 year manufacturers warranty.

IBM UltraStar Drives IBM

SIZE	DRIVE	SEEK TIME	RATE	INTERFACE	INT.	EXT.
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4.3GB	UltraStar 2 XP 34320	8.5ms	-	Ultra SCSI 3	925	985
4.3GB	UltraStar 2 XP Wide 34320	8.5ms	16.2 MB/Sec.	F&W Ultra SCSI 3	945	1030
9.1GB	UltraStar 2 XP 39100W	7.9ms	-	Ultra SCSI 3	1745	1805
9.1GB	UltraStar 2 XP Wide 39100W	7.9ms	15 MB/Sec.	F&W Ultra SCSI 3	1795	1880

All IBM UltraStar 2 drives listed are 7200 RPM,512K Buffer (unless noted otherwise)and are covered by a five year manufacturers warranty. Work station disk tab entry information available upon request.

Micropolis Drives MICROPOLIS

SIZE	DRIVE	SEEK TIME	RATE	INTERFACE	INT.	EXT.
4.3GB	Micrp.3243AV	8.5ms	-	F&W SCSI 2	865	935
4.3GB	Micrp. 3243WAV	8.5ms	6.7MB/Sec.	F&W SCSI 2	975	1075
4.3GB	Micrp.Tomahawk 4345	7.9ms	-	Ultra SCSI 3	875	935
4.5GB	Micrp.Tomahawk 4345AV	7.9ms	2MB CACHE -	F&W Ultra SCSI 3	975	1035
4.5GB	Micrp.Tomahawk 4345W	7.9ms	-	F&W Ultra SCSI 3	935	995
4.5GB	Micrp.Tomahawk 4345WAV	7.9ms	2MB CACHE -	F&W Ultra SCSI 3	1025	1095
8.7GB	Micrp.Tomahawk 3387W	7.9ms	16.4 MB/Sec.	F&W Ultra SCSI 3	1395	1455
9.1GB	Micrp.Tomahawk 3391	7.9ms	-	Ultra SCSI 3	1445	1495
9.1GB	Micrp.Tomahawk 3391AV	7.9ms	2MB CACHE -	Ultra SCSI 3	1555	1615
9.1GB	Micrp. Tomahawk 3391W	7.9ms	-	F&W Ultra SCSI 3	1555	1625
9.1GB	Micrp. Tomahawk 3391WAV	7.9ms	2MB CACHE -	F&W Ultra SCSI 3	1675	1735

All Micropolis drives are 7200 RPM, 512K Buffer and covered by a 5 year warranty. Mounting brackets and cables available for all current and former Mac's & Clones

Barracuda Series Seagate

SIZE	DRIVE	SEEK TIME	RATE	INTERFACE	INT.	EXT.
4.3GB	Barracuda ST15150N	8ms	-	Fast SCSI 2	1050	1110
4.3GB	Barracuda ST15150W	8ms	12.2 MB/Sec.	F&W SCSI 2	1095	1180

7200 RPM,1024K Buffer

Barracuda Series Seagate

SIZE	DRIVE	SEEK TIME	RATE	INTERFACE	INT.	EXT.
2.5GB	Barracuda ST32171N	8ms	-	Ultra SCSI 3	715	775
2.5GB	Barracuda ST32171W	8ms	17.6 MB/Sec.	F&W Ultra SCSI 3	775	845
4.3GB	Barracuda LP ST34371N	7.9ms	-	Ultra SCSI 3	1110	1180
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9.1GB	Barracuda 19171N	7.9ms	-	Ultra SCSI 3	1995	2075
9.1GB	Barracuda 19171W	7.9ms	18 MB/Sec.	F&W Ultra SCSI 3	2075	2175
9.0GB	Elite ST410800W (5400 RPM)	11ms	16MB/Sec.	F&W SCSI 2	1875	1975
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4-8	Sony 7000 DAT DDS-2	DAT 120M	90MB	-	989
24-48	HP1553 Auto Tape Loader	DAT 120M	60MB	-	2495
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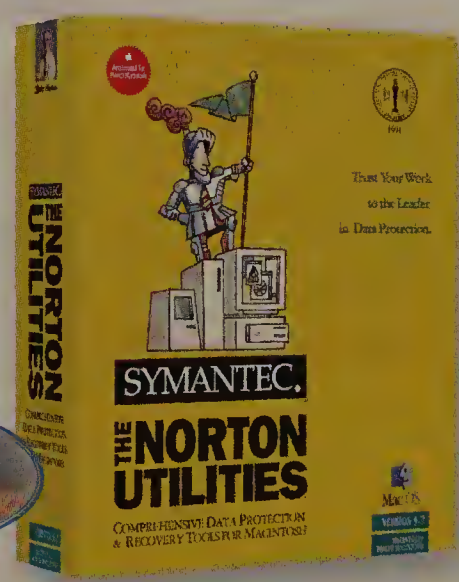

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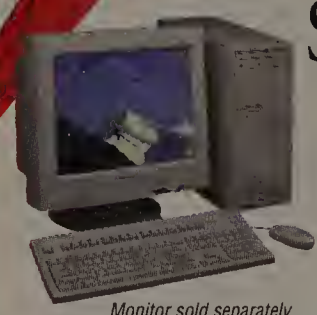

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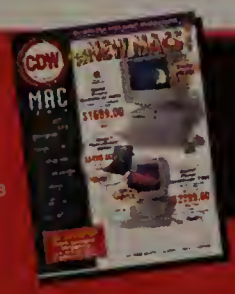

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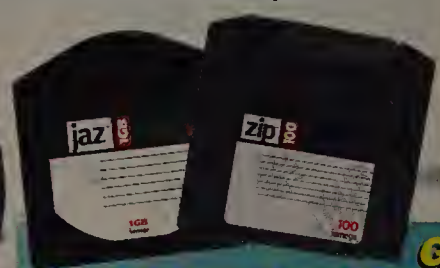

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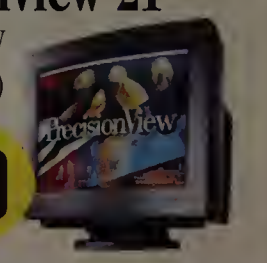

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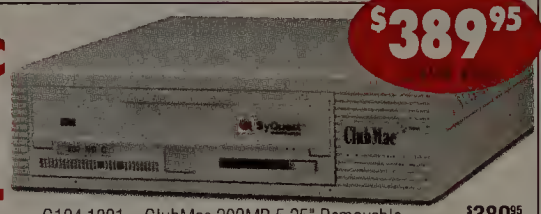

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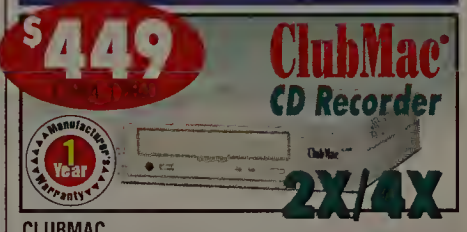

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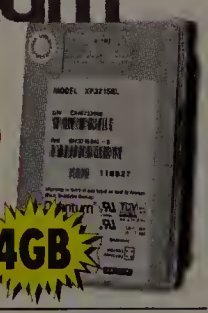

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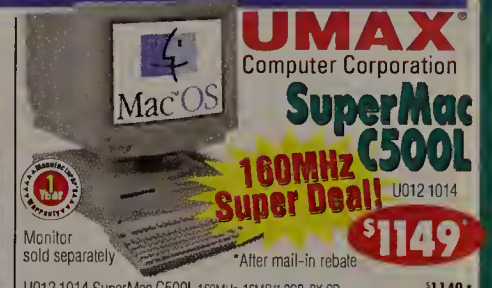

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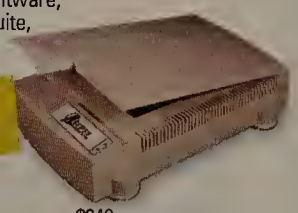

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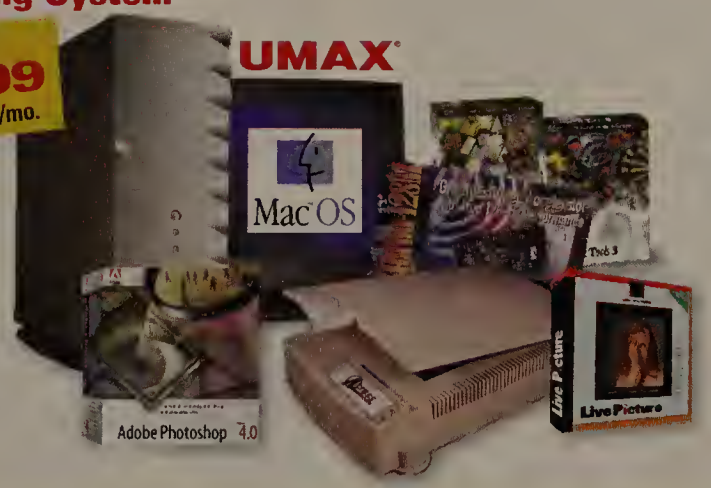

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						Int	Ext
4100MB	7.9ms	7200rpm	512K	MC4341	5yr	$739	$809
4550MB	7.9ms	7200rpm	512K	MC4345	5yr	$825	$895
9091MB	8.5ms	7200rpm	512K	MC3391	5yr	$1345	$1415
SCSI A/V - Drives fine tuned for audio and video applications.							
4550MB	7.9ms	7200rpm	512K	MC4345AV	5yr	$909	$979
9091MB	8.5ms	7200rpm	512K	MC3391AV	5yr	$1459	$1529
WIDE SCSI							
4294MB	8ms	7200rpm	512K	MC3243W	5yr	$799	$929
4550MB	7.9ms	7200rpm	512K	MC4345W	5yr	$875	$1005
9091MB	8.5ms	7200rpm	512K	MC3391W	5yr	$1455	$1585
WIDE SCSI A/V							
4294MB	8ms	7200rpm	512K	MC3243WAV	5yr	$829	$959
4550MB	7.9ms	7200rpm	512K	MC4345WAV	5yr	$959	$1089
9091MB	8.5ms	7200rpm	512K	MC3391WAV	5yr	$1569	$1699

Seagate

1050MB	9ms	5400rpm	512K	ST31055N	5yr	$299	$369
2150MB	9ms	5400rpm	512K	ST32155N	5yr	$475	$545
2150MB	8ms	7200rpm	1024K	ST32171N	5yr	$649	$719
4350MB	8ms	7200rpm	512K	ST34371N	5yr	$989	$1059
9100MB	8ms	7200rpm	512K	ST19171N	5yr	$1869	$1939
23200MB	13ms	5400rpm	512K	ST423451N	5yr	$3869	$3969
WIDE SCSI							
1050MB	9ms	5400rpm	512K	ST31055W	5yr	$369	$499
2150MB	9ms	5400rpm	512K	ST32155W	5yr	$499	$629
2150MB	8ms	7200rpm	1024K	ST32171W	5yr	$679	$819
4350MB	8ms	7200rpm	1024K	ST34371W	5yr	$1039	$1169
4550MB	7.5ms	10,000rpm	512K	ST34501W	5yr	$1399	$1529
9100MB	8ms	7200rpm	1024K	ST19171W	5yr	$2149	$2279
9100MB	8ms	10,000rpm	512K	ST19101W	5yr	$3599	$3729
23200MB	13ms	5400rpm	512K	ST423451W	5yr	$3899	$4099

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2151MB	10ms	5400rpm	128K	FB32160S	3yr	$339	$409
3228MB	10ms	5400rpm	128K	FB33240S	3yr	$389	$459
3254MB	10.5ms	4500rpm	128K	TM33200S	3yr	$355	$425
4310MB	10ms	5400rpm	128K	FB34320S	3yr	$479	$549
4550MB	8ms	7200rpm	512K	XP34550S	5yr	$879	$949
6448MB	10ms	5400rpm	128K	FB36480S	3yr	$599	$669
9100MB	8ms	7200rpm	512K	XP39100S	5yr	$1399	$1469
WIDE SCSI							
4550MB	8ms	7200rpm	512K	XP34550W	5yr	$939	$1069
9100MB	8ms	7200rpm	512K	XP39100W	5yr	$1599	$1729

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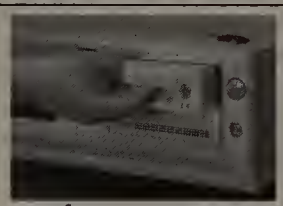
WIDE SCSI							
4400MB	8ms	7200rpm	512K	M2954W	5yr	$849	$979
9100MB	8ms	7200rpm	512K	M2949W	5yr	$1559	$1689



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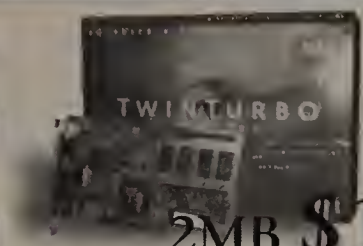

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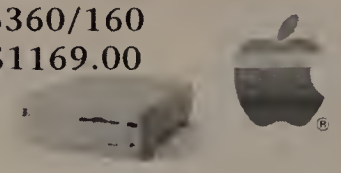

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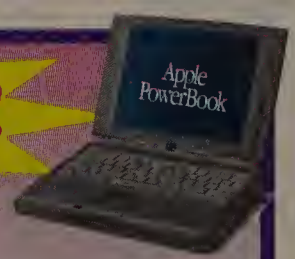

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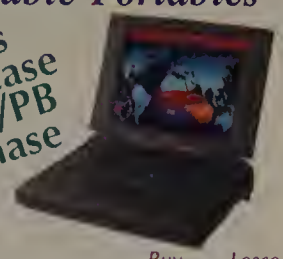

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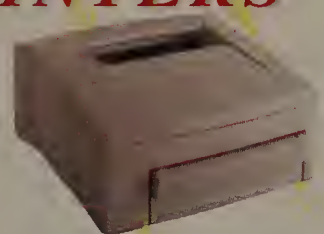

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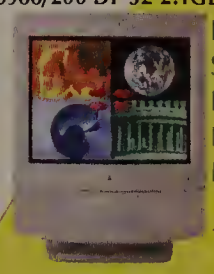

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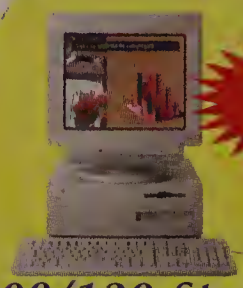

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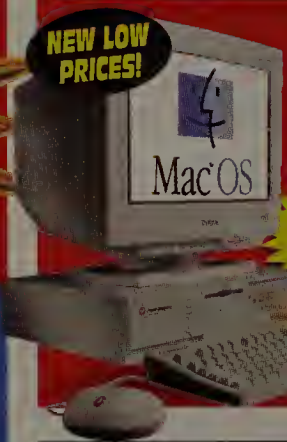

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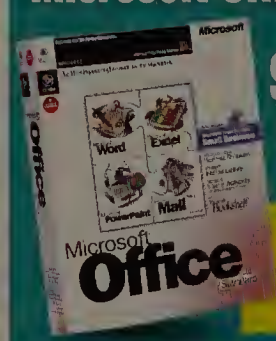

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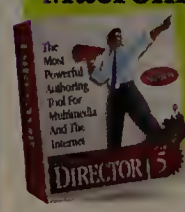

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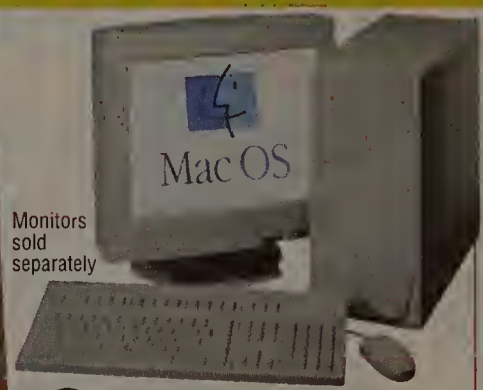

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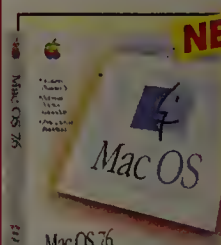

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94094	FUJI 3.5" MF2HD Mac Formatted 10-Pk 1.4M8	$5.20
91952	FUJI CDR-74	$7.80
05717	Fuji DG90M 4mm Data Grade Tape 1.95G8	$6.49

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97291	8ernoulli MultiDisk 150M8 Single Cart	$94.49
91160	Zip Media Mac100 3-Pack	$49.99
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86251	Kyocera CDR-74	$7.79

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83415	Performantz 200M8 Cart	$54.49
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83416	Performantz 88M8 Cart	$36.69
40359	Performantz SyDuest Comp EZ135MB Cart	$19.99

Philips

89805	Philips CD-Recordable 74 Min Disk	$7.80

Sony

01140	Sony 3.5" 230M8 M.D. 512b/s	$15.71
14368	Sony CD-R 650M8 74 Min Disk	$7.80
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32804	Sony SRS-PC21 PC Speakers	$22.16

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97992	SyDuest 270M8 3.5" Removable Cartridge	$52.29
02183	SyDuest 44M8 Cart Unformatted	$42.29
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24910	SyDuest EZ135M8 3.5" Cartridge 10-Pk	$198.89
24909	SyDuest EZ135M8 3.5" Cartridge 5-Pk	$109.99

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21922	Verbatim CD-R 74min 4x	$6.55

Scanners

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02135	AGFA Arcus II Scanner, Mac Version	$1875.00
89851	AGFA StudioScan IIsi Color Scanner	$630.48
06686	AGFA StudioStar	$968.84
06685	AGFA StudioStar LE	$792.79

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91854	Adesso Soft Touch Keyboard	$44.09
90766	Tru-Form Extended Keyboard	$73.18
85594	Tru-Form Extended Keyboard w/Touchpad	$90.91

Apple

93374	Design Keyboard	$84.49
94461	Extended Keyboard II	$154.49

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83409	Epson Stylus Color 500 Inkjet Printer	$278.31
80668	Epson Stylus Color 800 Printer	$449.99
87980	Epson Stylus Color Pro XL InkJet Printer	$1780.00

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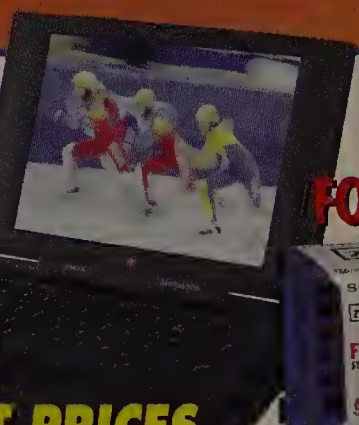

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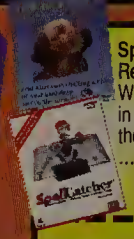

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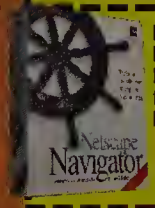

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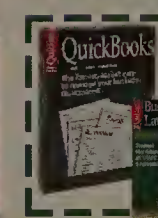

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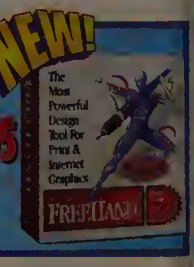

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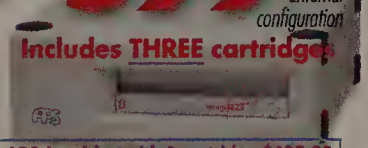

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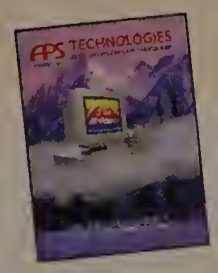

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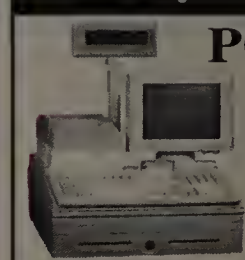

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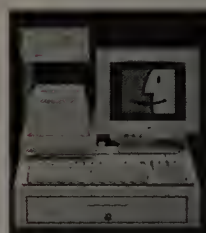

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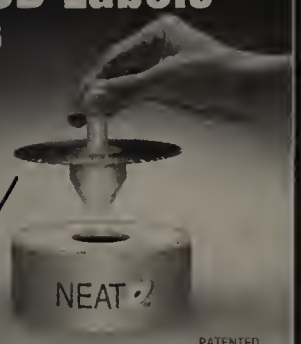

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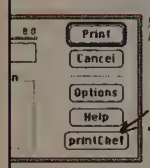

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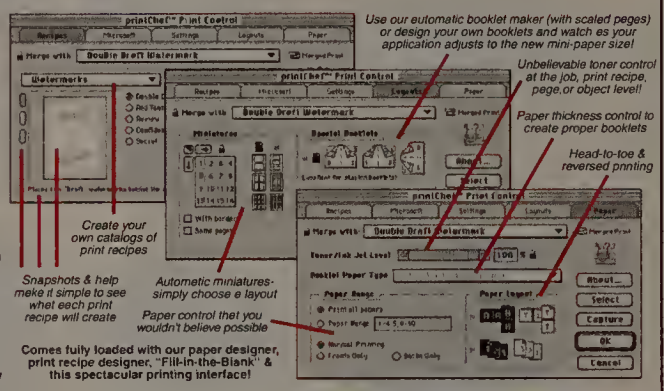

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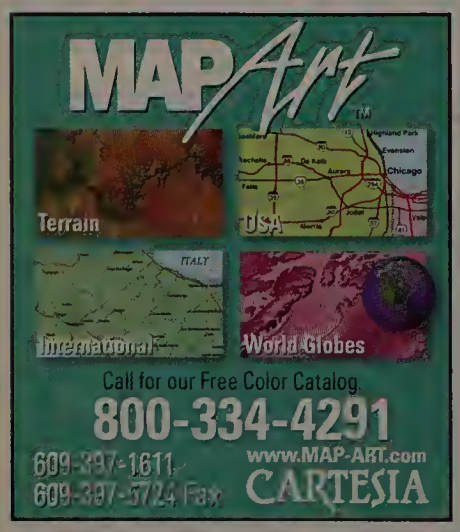

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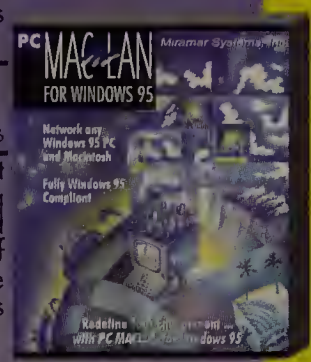

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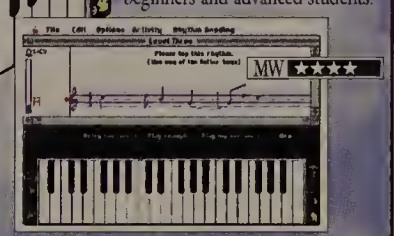

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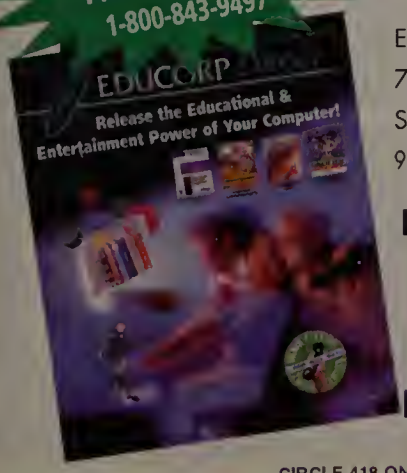

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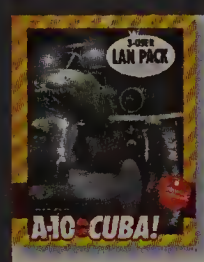

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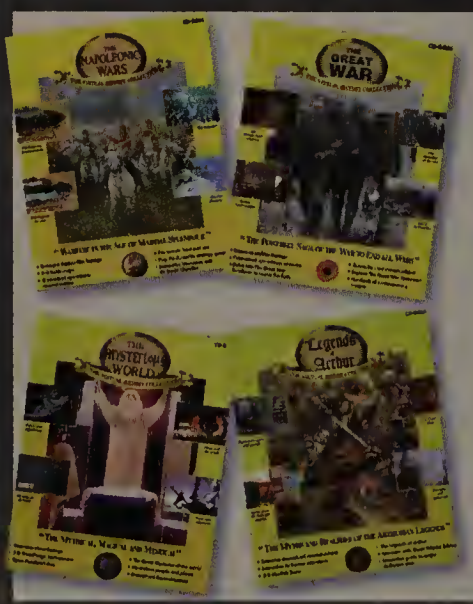

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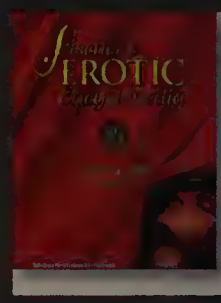

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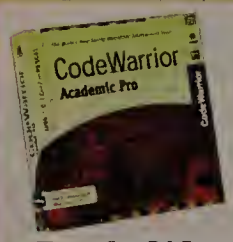

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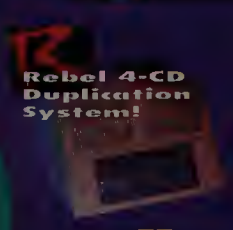

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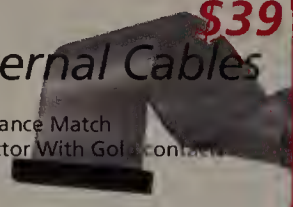

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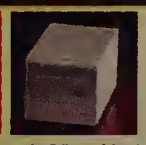

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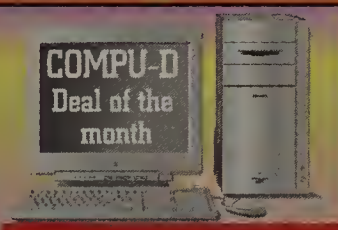

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DUO 280 & 250	8-240	$799/499

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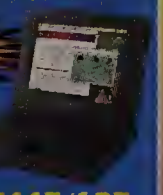

Dou Dock+/Floppy & Adptr.	$445/195
14.4 Fax/Modem f/all Duo's	$95
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Iomega	Zip Drive SCSI /10 pack Cartridge	$189/129
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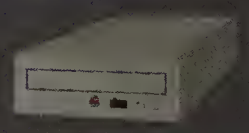

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AppleVision 1710AV - Display	[illegible]

PRINTERS

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Color StyleWriter 1500 - New	[illegible]
Color StyleWriter 2500 - New	[illegible]
LaserWriter 12/640PS - 600 dpi	[illegible]
LaserWriter 16/600PS- 600 dpi	[illegible]

PARTS/ACCESSORIES

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Apple Design Speakers - JBL Design	[illegible]
Apple Design Speakers II - "Great Sound"	[illegible]
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PowerMac AV Card - for 6100/7100/8100	[illegible]
6100 DOS Card - 486DX266/Full Kit	[illegible]
PB 190 Upgrade- Video Out Card	[illegible]
PB 190 Upgrade - Infrared Card	[illegible]
Performa MPEG Card - for 630-63[illegible] series	[illegible]
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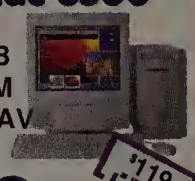

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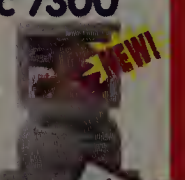

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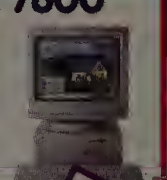

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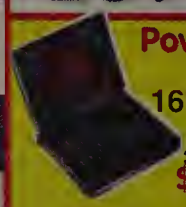

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J700/180	24/2G/8XCD	2199
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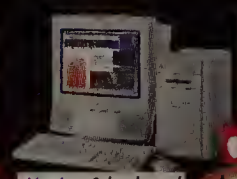

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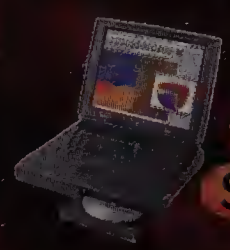

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- 2GB HD
- 6X CD

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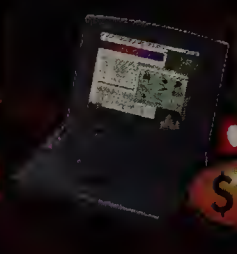

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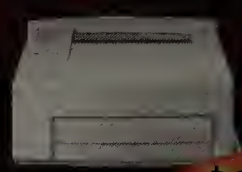

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9500/180	MP 32/2GB/8XCD/L2	3649
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8500/180	32/2G8/8XCD/L2	2549
8500/150	16/2GB/8XCO/L2	2195
8500/150	16/1.2GB/8XCD/L2	2095
8500/120	16/2GB/4XCO/L2	1649
7600/132	16/2GB/8XCO/L2	1829
7600/132	16/1.2GB/8XCD/L2	1699
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7300/180	16/2G8/12XCD/L2	2164
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5300C	8/500	1849
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DUO2300C	20/1.1GB/14.4 Mod	1649
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J700/180	24/2GB/6.7CD/KEY/VCard	2849
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S900/225	32/2GB/8.0CO/KEY/VCard	3959
S900/200	Dual Processor Model	4499
S900/200	32/2GB/8.0CO/KEY/VCard	3499
S900/180	Dual Processor Model	4235
S900/180	32/2GB/8.0CD/KEY/VCard	3315
S900/150	32/2GB/8.0CD/KEY/VCard	3219

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3000/200 DT	16MB/1.2GB/8XCD/L2	1655
3000/200 MT	32MB/2.5GB/8XCD/L2	1855
3000/240 MT	32MB/2.5GB/8XCD/L2	2399
4000/160 DT	16MB/1.2GB/8XCD/L2	1695
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IMS	Twin Turbo 4mb V-card	442
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TrueVision	Targa 1000	1483
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Apple	Multiscan 15" AV	459
Apple	Multiscan 1705	675
Apple	Multiscan 1710	889
Apple	Multiscan 1710AV	899
Apple	Multiscan 20"	1699
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Iiyama	VisionMaster 17"Pro	659
Iiyama	VisionMaster 21"	1399
Iiyama	VisionMaster 21"Pro	1469
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Mitsubishi	Diamond Pro 21TX	1549
NEC	Multisync XV15+	415
NEC	Multisync XV17+	739
NEC	Multisync M700	739
NEC	Multisync XE21	1649
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Sony	Multiscan 20SF2 20"	1599
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Quantum	1.2 GB Fireball	250	310
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Quantum	3.2 GB Fireball	363	423
Quantum	2.1 GB Atlas	495	555
Quantum	4.3 GB Atlas	935	1065
Quantum	4.5 GB Atlas II	909	1039
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Seagate	2.1 GB ST32155N	499	559
Toshiba	850 MB 2.5" SCSI	589	--

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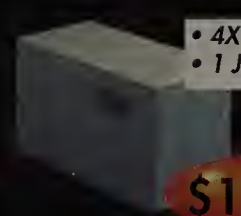

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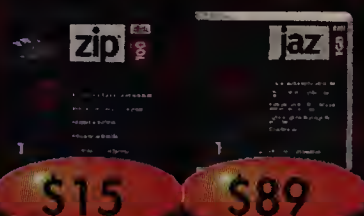
Global Village 33.6

$162

Iomega Cartridges



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SyQuest Cartridges

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Apple	LW 12/660PS/Color	5100
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Epson	Stylus Color Pro XLWide	1685
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Nomai	20DMB	56

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Epson	Express.636 Exec.	821
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Microtek	Scanmaker E6	840
Microtek	Scanmaker III	1339
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Poloroid	Sprintscan Plus	1989
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Umax	VistaS6E ProMac	525
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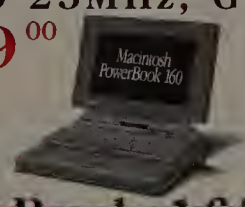

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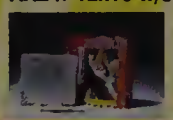

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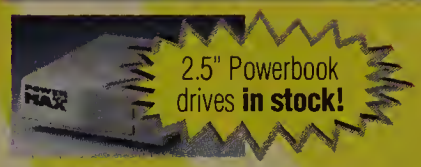

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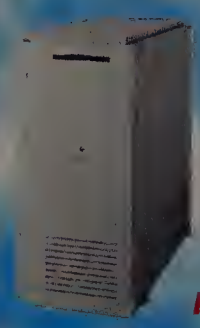

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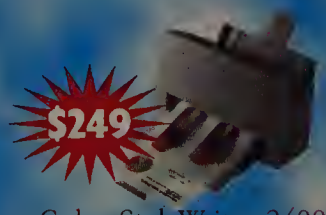

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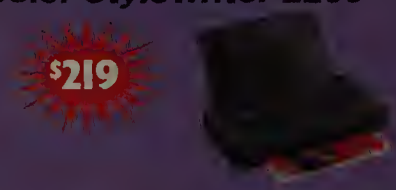

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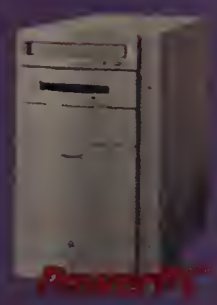

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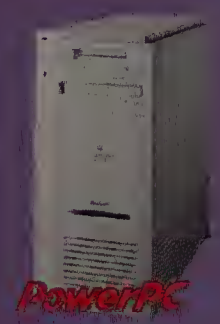

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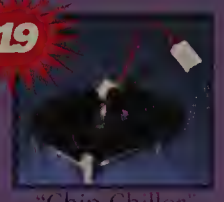

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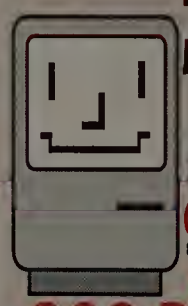

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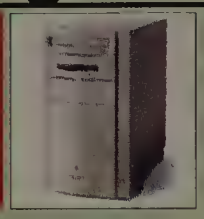

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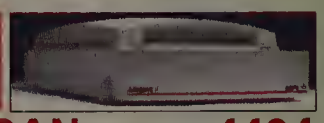

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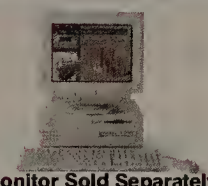

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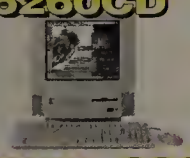

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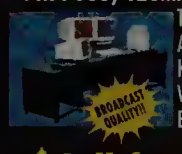

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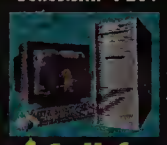

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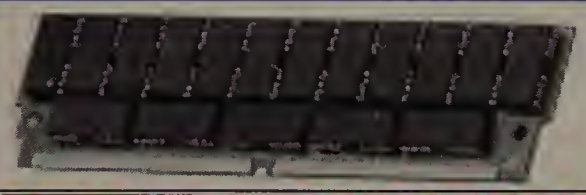

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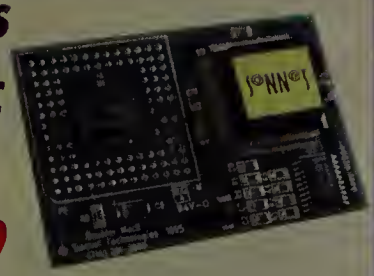

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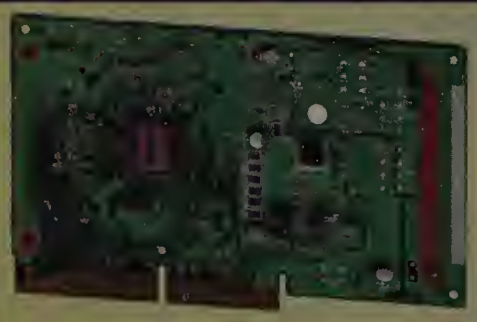

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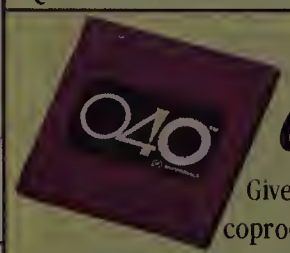

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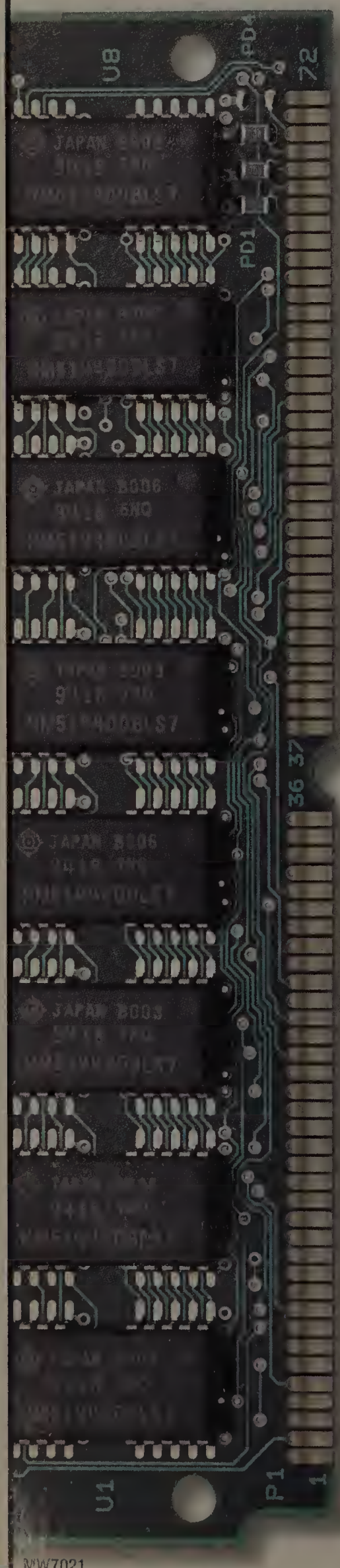

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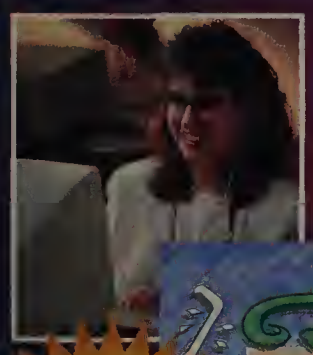

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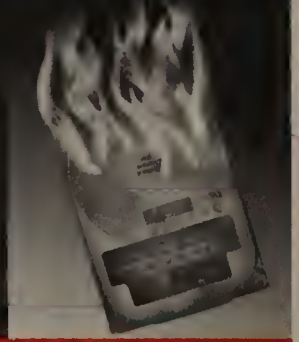

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continued from page 238

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And I wrote the very first DOS.
I put my software and IBM together—
I got profit, and they got the loss.
I write the code that makes the whole world run;
I'm gettin' royalties from *everyone.*
Sometimes it's garbage, but the press is snowed;
You buy the box, I sell the code.

Every software company
Is doing Microsoft's R&D;
You can't keep a good idea down these days.
Even Windows is a hack
We kinda based loosely on the Mac.
So it's big, so it's slow—
You've got nowhere to go!
I need cash, I don't need praise!

I write the code that fits the world today:
Big mediocrity in every way.
We'll make the Mac OS's share erode;
You'll have no choice—you'll buy my code.
I am Bill Gates, and I write the code!

SCENE 3
The Macworld Expo.

REPORTER: It's the best-attended Macworld Expo ever, and as our paper sees it, that's a sure sign that Apple is dying. In fact, Apple has just canceled its Copland operating system, and the fans are not pleased.

CHORUS OF MAC FANS *(to the tune of "Matchmaker"):*
Mac maker, Mac maker, find an OS,
Buy us a way out of this mess!
Mac maker, Mac maker, please show some guts—
Do something to save our butts!

Mac maker, look, System 7 is swell;
Works great for me, works very well.
But all the magazines say it's passé,
So buy an OS today!
For Tesler, make it Net-savvy;
For Hancock, make it simply not suck.
For Gil, well, he would be happy
For anything under a billion bucks!

Mac maker, Mac maker, you know the tune:
Time's running out! Buy something soon!
Be OS, Next OS—who could care less?
So find us a find, try us a try,
Deal us a deal, buy us a buy—
Just get us a new OS!

REPORTER: How about you, sir? Will Apple's financial situation affect your next computer purchase?

AVERAGE GUY *(to the tune of "When I'm 64"):*
What should I buy? I'm losing my hair.
Many years from now,
Will obsolescence haunt my Mac equipment list?
And will Apple even exist?
I read the *Wall Street Journal* today:
Says Apple's at death's door.
Will we still see Macs,
Will there still be Macs,
When I'm 64?

Windows is safe, but harder to use,
That's what people say;
Nothin' but a hassle using CD-ROMs;
Twice a day the whole machine bombs.

Forget the whole thing, I'll wait a few years,
To see who wins the war.
I'll stick with my dusty,
Sluggish but trusty,
Commodore 64!

SCENE 4
Apple's Cupertino headquarters.

REPORTER: Apple just bought Next—and with it comes Apple cofounder Steve Jobs. Yes, the same man his own board kicked out of the company 12 years ago. Let's listen now as he addresses the crowd.

STEVE JOBS *(to the tune of "Don't Cry for Me, Argentina"):*
It won't be easy; you'll think I'm strange,
When I try to explain why I'm back
After telling the press Apple's future is black.
You won't believe me;
All that you see is the kid in his teens
Who started out in a garage
With only a buddy named Woz.
(*Hey*—you *try rhyming with* garage!)

Don't cry for me, Cupertino!
The truth is, I never left you.
I know the ropes now, know what the tricks are;
I made some millions over at Pixar.
Don't cry for me, Cupertino!
I still have the drive and vision!
I still wear sandals in any weather—
It's just that these days,
They're Gucci leather.

REPORTER (*approaching a lone figure at the back of the crowd*): Hey you! Don't you write for *Macworld*? How about a quote for my story about how Apple's latest plan will never work?

MACWORLD COLUMNIST *(to the tune of "The Band Played On"):*
They all assumed that poor Apple was doomed,
But the Mac played on;
This was before, back in late '84,
But the Mac played on.
By the very next year, the press had it to here,
Predicting that Apple'd be gone;
They hadn't foreseen how we'd love this machine,
And the Mac played on.

Soon Steve Jobs split, and they said that was it,
But the Mac played on;
I recall well how the Apple stock fell,
But the Mac played on.
There was hope in the land when John Sculley was canned,
But analysts stifled a yawn;
They just couldn't deal with the fans and their zeal,
And the Mac played on.

Lately it seems even Apple just dreams
That the Mac plays on;
All the bad press, and the market-share mess:
Can the Mac play on?

Well, we've all heard such fears every day for 12 years,
Yet here we are, somehow still drawn . . .
So somehow I know that despite any blow
The Mac *will* play on! **m**

Contributing editor DAVID POGUE is a songwriter and former Broadway theater conductor.

The Desktop Critic

by David Pogue

"Apple!"—The New Musical Comedy

AMELIO, GATES, JOBS—NOW THAT'S ENTERTAINMENT

THE GREAT GREEK DRAMAS had three essentials: conflict; a hero brought down by his own pride; and a deus ex machina, a god who sweeps down at the end and solves everything. Sound familiar? Sure it does—it's the story of Apple's life. This is theater! Or, as I see it, *musical* theater.

SCENE 1

Apple headquarters. CEO Michael Spindler is at his desk. Gil Amelio bursts in, surrounded by reporters.

SPINDLER: Gil Amelio! What the—?

AMELIO: Sorry, Diesel-man. You've been fired by the board. They say you bungled the clone thing.

SPINDLER *(to the tune of "Send in the Clowns"):*
Isn't it rich? Can it be true?
I did exactly what they told me to do:
Send in the clones.
Sure, I had doubts. Think IBM:
Once they were king of the hill—
Now look at them.
Killed by the clones. Did we want clones?

Year after year, we said "No way."
Who said that cloning was any less dangerous today?
What do they say when our customers buy clones instead?
"Long live the Mac—Apple is dead!"

Don't you love risk? Gambles and fear?
Cloning our crown jewel so late
In its career?
And fostering clones . . . yes, Macintosh clones . . .
Get ready; they're here.
(He cleans out his desk and leaves.)

REPORTER: Dr. Amelio, they've offered you $10 million, which you keep whether you rescue Apple or not. Do you think you'll succeed where others have failed?

AMELIO *(to the tune of "I Will Survive"):*
At first I was afraid; I was petrified.
Kept thinking, "Gil, old man, to take this job is suicide."
Remember Spindler's final bow,
Brother, where's the poor guy now?
Remember Sculley? Remember him?
Remember how—

They all are gone! Pushed out the door!
The Apple board just told 'em,
"Fellas, you're not welcome anymore."

What makes me think I won't be next to get the boot?
Oh yeah—my contract! Ten-million-dollar parachute!

Oh yeah, that's right! I will survive!
As long as they've got money left,
I know I'll stay alive.
While I've still got bills to pay,
I've still got the will to stay,
I will survive . . . I will survive!
Hey, hey! I will survive!
I can't exercise my options till the stock hits 35.
No one doubts me anymore—
Look, I did it once before.
I will survive! I will survive!

REPORTER: Oh, well, too bad, I've already turned in my article about your failure.

AMELIO: What? Even before the interview? But our statistics show that—

REPORTER *(to the tune of "What's Love Got to Do with It?"):*
You must understand
That the story I've planned
Is a sweeping tale;
It's got a great slant
About how Macintosh can't
Recover and prevail.
It's sensational . . .
Just sensational . . .
I made up the numbers,
But that's just a detail!

Oh-oh-oh! What's fact got to do, got to do with it?
What's truth if the story's not compelling?
What's fact got to do, got to do with it?
I'm in good shape if the paper is selling!

It may seem to you
That our newspaper's view
Only tells one side—
That Apple is dying—
And our paper is trying
To speed up its slide.
Well, if that's your view . . .
Gold star for you!
So what if our principles are undignified?

Oh-oh-oh! What's real got to do, got to do with it?
What's Apple but a giant we caught nappin'?
What's fact got to do, got to do with it?
If we repeat it enough it'll happen!
Oh-oh-oh!

continues on page 237

ANDREW SHACHAT

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Help | Accounts | Register | Checks | Prn Chks | Calendar | Cat | Transfer | Reconcile | Graphs | Budget | Retrieve

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This Is Where...

98.7% Page 1

Power HD

Apps Server

Checking: R

DATE	NUMBER	DESCRIPTION / CATEGORY	MEMO
12/12 1996		Opening Balance [Checking]	
12/12 1996	1001	Rent	
12/12 1996		Car Payment	
12/12 1996			

Record | Restore | SPLITS

Net Worth Graph

Monthly Assets, Liabilities and Net Worth

$ in 1,000.00

60

Income and Expense Graph

Monthly Income and Expenses
4/1/96 - 11/30/96

$ in 1,000.00

10 8 6 4 2 0

4/96 5/96 6/96 7/96 8/96 9/96 10/96 11/96

Net Savings and Expense Comparison
as a Percentage of Total Income

checking: Write Checks

PAY TO THE ORDER OF Bill Goins DATE 12/12/96 $ 750.00

Seven hundred fifty and 00/100********** DOLLARS

ADDRESS 804 Martin Luther King Blvd.
Smithtown, TX
78756

MEMO Not Trout & Rice

CATEGORY Entertainment

Record | Restore | SPLITS | Current Balance: $ 750.00

Payee & Description Contains

Date: All Transactions

Cancel | OK

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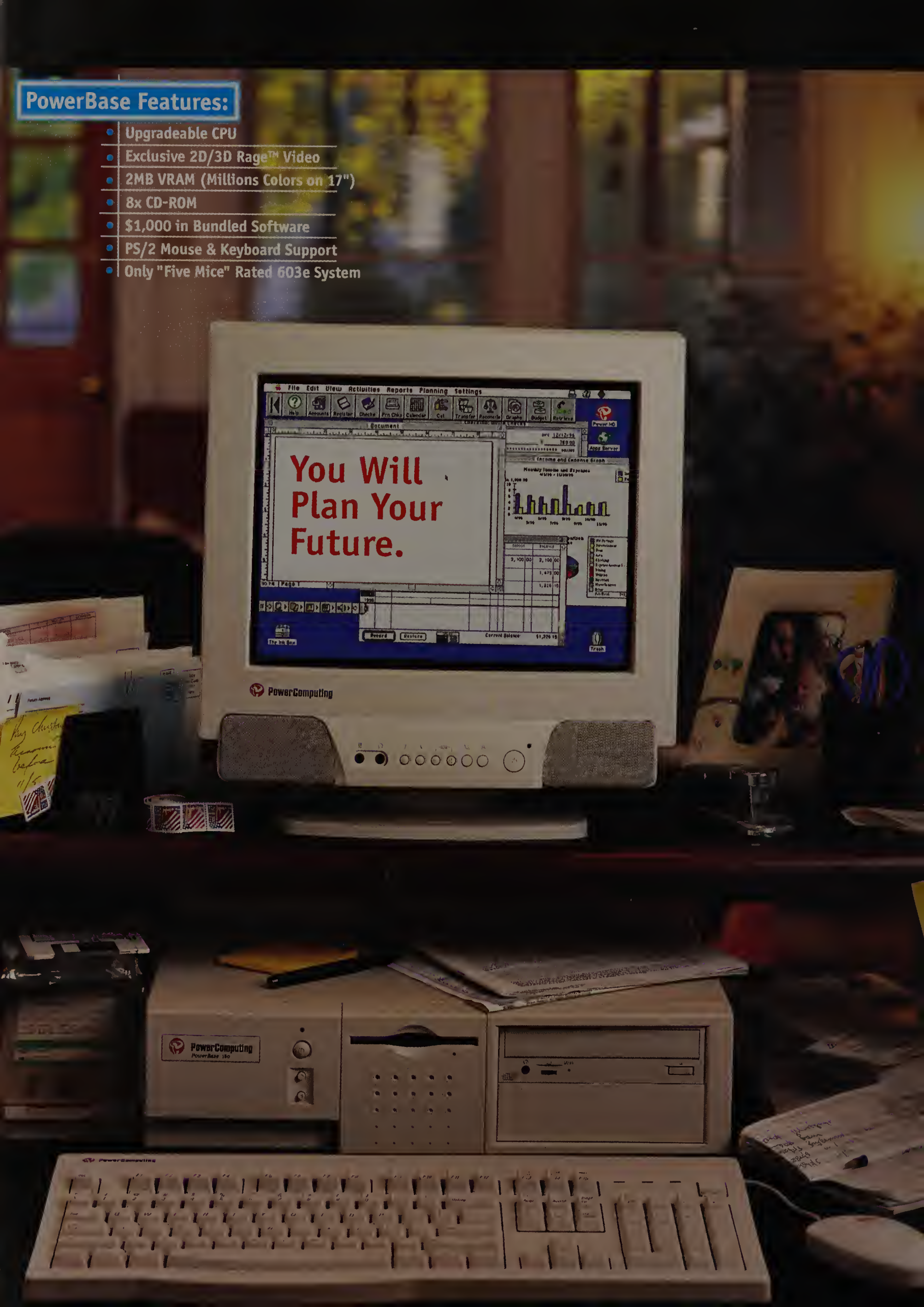

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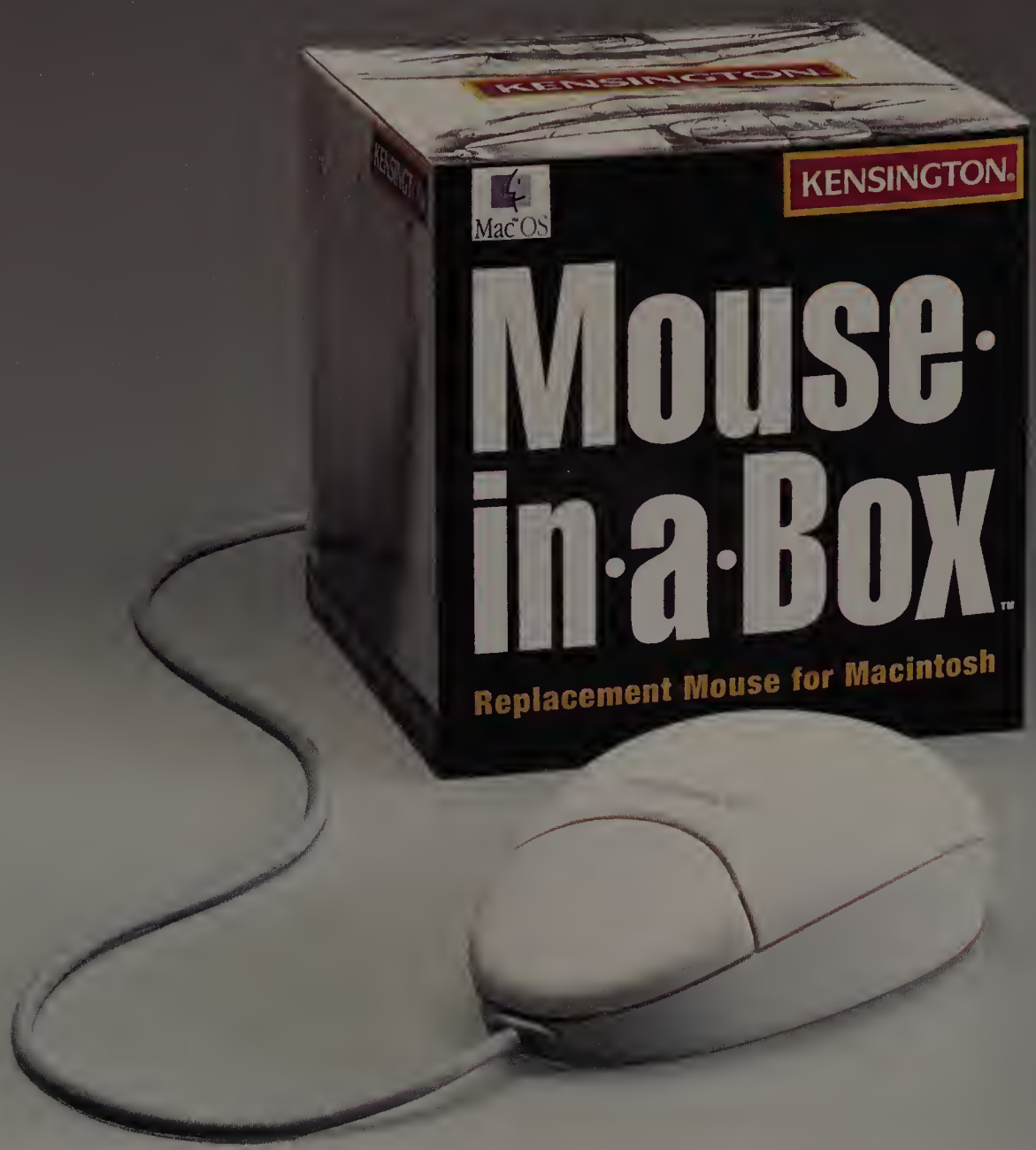

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